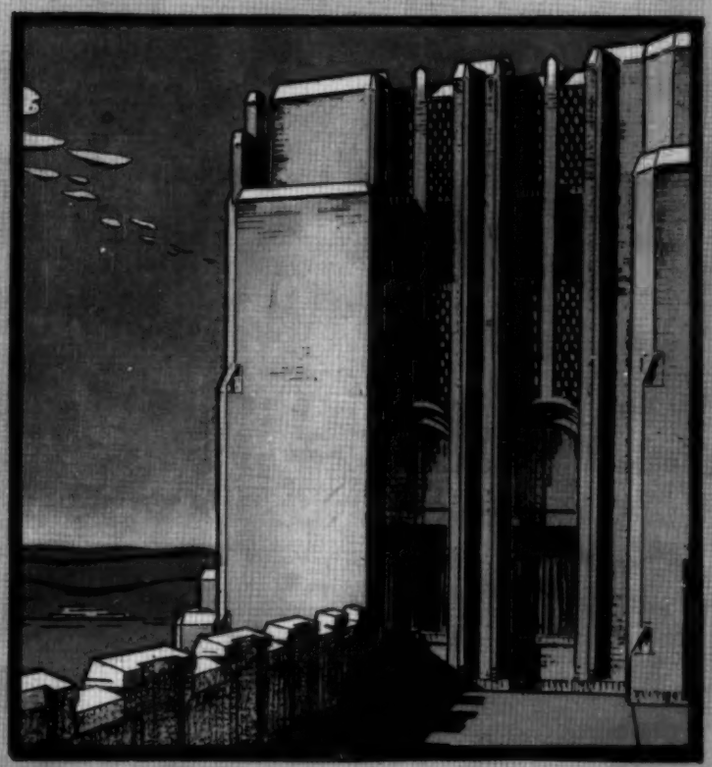
THE ARCHITECTURAL FORUM

IN TWO PARTS



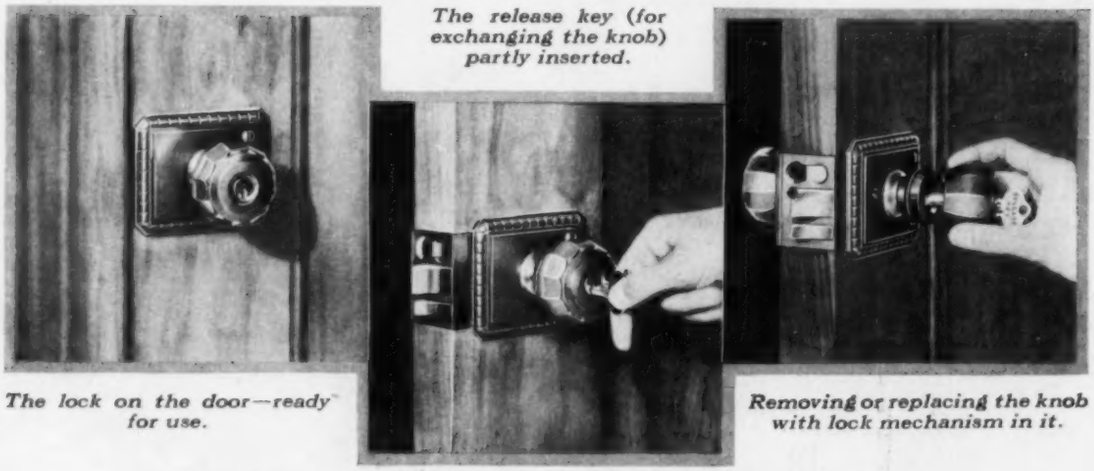
PART ONE
ARCHITECTURAL DESIGN

JANUARY

1929

The new Sargent Union Lock
with demountable knob and exchangeable cylinder makes an ideal equipment for office buildings

HOW IT WORKS



The lock on the door—ready for use.

The release key (for exchanging the knob) partly inserted.

Removing or replacing the knob with lock mechanism in it.

The hardware shown is a proprietary design made for the Fisher Building, Detroit

This lock is one complete unit. Knobs, escutcheons, lock mechanism—all are clamped solidly together. It is easy to install. Its operation is smooth and sure. And it is made of solid bronze or brass.

It is a unique lock—designed especially for modern building needs. The outside knob can be removed with the turn of a special key, the cylinder exchanged—and the knob mechanism replaced in a moment. A supply of extra knobs complete with cylinder or a supply of extra cylinders provides new locking for any door at any time.

There can be no "extra" keys to this Sargent Union Lock with demountable knob and exchangeable cylinder. Lost, forgotten or unreturned keys cannot be used. The building management, at a negligible cost, can offer every new tenant a lock that only his key and the master keys will fit.

This lock is also of immeasurable value in those modern office buildings where the partitioning of the floor space is done according to the particular needs and requirements of each particular tenant. Extra locks, extra knobs and extra cylinders may be kept on hand for use as they are required.

A pamphlet, "Important and Exculsive New Feature in Locks for Office Buildings," which explains this new Sargent Union Lock in detail, will be sent on application. Sargent & Company, New Haven, Conn.; 94 Centre Street, New York; 150 North Wacker Drive (at Randolph), Chicago.

SARGENT

LOCKS AND HARDWARE

THE ARCHITECTURAL FORUM

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*Illustrated ex.—exterior in.—interior pl.—plan

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STATE TOWER BUILDING, SYRACUSE

THOMPSON & CHURCHILL, ARCHITECTS

From a Water Color Rendering by Norman Reeves

THE
ARCHITECTURAL
FORUM

VOLUME L NUMBER ONE

JANUARY 1929

THE STATE TOWER BUILDING, SYRACUSE

THOMPSON & CHURCHILL, Architects

BY
HENRY S. CHURCHILL

THE site of the State Tower Building in Syracuse, formerly known as "the old Bastable site," is one of considerable historical interest. Popular tradition has it that here was one of the principal "long houses" of the Onondagas;—that then as now it was at the crossing of the main trails from east to west and from north to south, and the most important meeting place for the councils of the Five Nations. Today it is the site of the tallest building between New York and Buffalo. The State Tower Building has about 130,000 square feet of office space in ten main stories and a 20-story tower, besides a law library, pent house, and observation platform. The decision to erect so large a building in a city the size of Syracuse was made only after a careful survey of the needs and potentialities of the city. With a plot large enough for the required office area in a low building of uniform height, the tower form was chosen because it provided maximum permanent light for all offices, plus a much needed garage, plus advertising value. Results justified the choice, since two months after completion the building was 80 per cent rented, and almost wholly rented a little later.

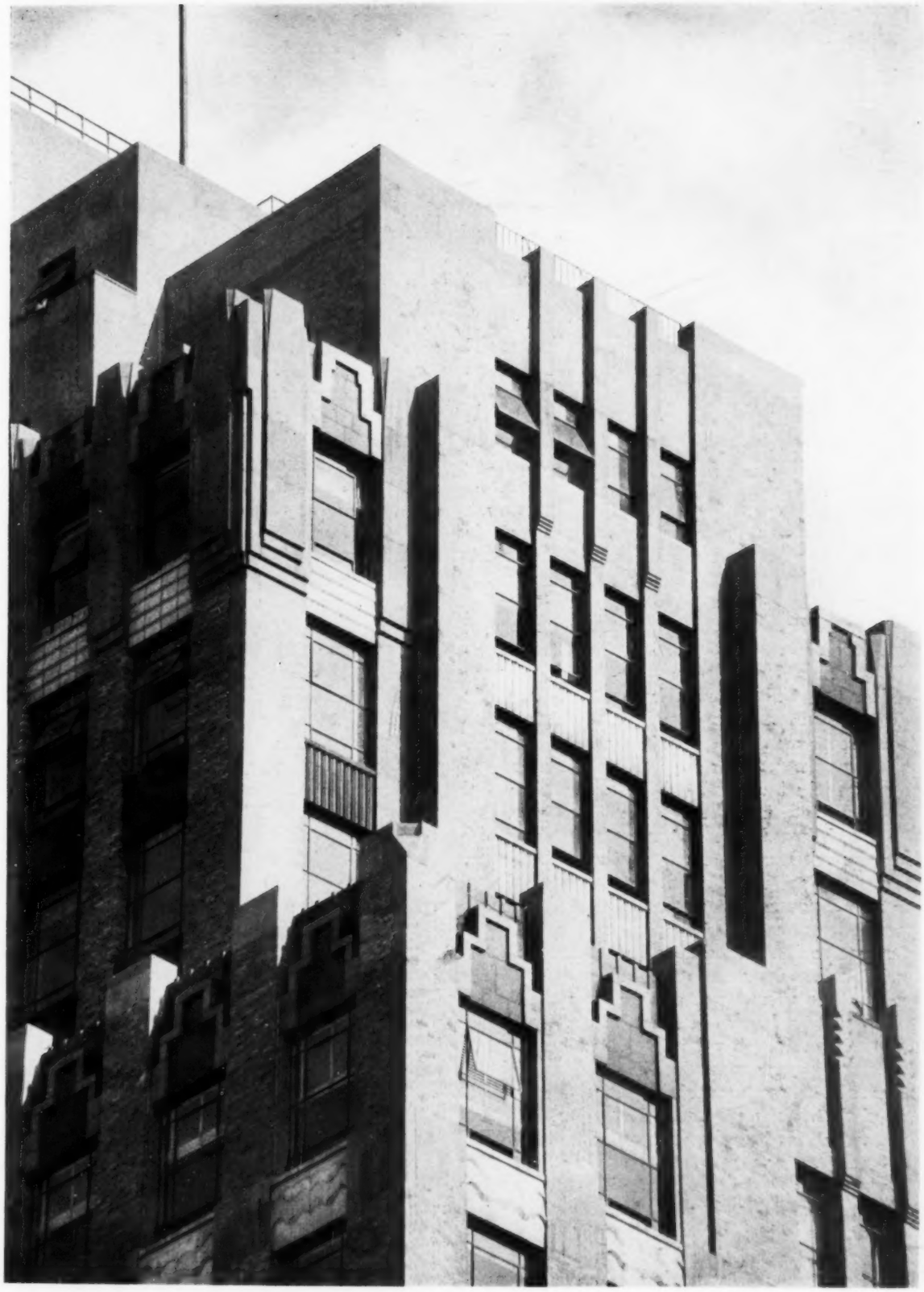
Located at the intersection of Genessee, Warren and Water Streets, the ten office stories face on Genessee Street, with the tower rising for ten more on Warren Street, facing Clinton Square, the heart of the city. The service entrance and garage are on Water Street. The plan was largely influenced by the desirability of providing entrances from all three streets, and giving the stores additional display space on the arcade so created. The fire passage at the rear of the Genessee Street stores, required by the state mercantile code, has been decoratively developed as a further feature, thus giving access to all stores from inside the building.

Architecturally, the State Tower was conceived simply as a "modern" building deriving directly from the plan and from its function as an office structure. The most available and simplest materials were used. It was felt, however, that there was no reason why a commercial, highly standardized building should be either extravagantly costly or stupidly ugly; nor, with all the colorful materials now available, why it should be drab. Color is therefore extensively used. Brick, terra cotta, and some cast stone are the principal exterior materials. All windows above the second floor are stock, and only two sizes are used. In an office building the window is the most important element of design, and should serve as the module. In this case a definite rhythmic alternation of windows and piers, conforming to the office divisions, was worked out. Further emphasis was given to this scheme by the dark spandrels, by capping the piers with cast stone, and by stopping alternate piers at different levels. This latter device also provided for the large second floor display windows, and allowed them to be tied in with the store windows below, creating a form that definitely avoids the illusion of "resting on glass" so common to buildings with cantilevered first floor columns. Store and second floor windows are copper kalamein. The store windows are separated by cast iron pilasters that help tie the larger units into the whole design. The basic color scheme is warm tan and brown. The brickwork is graded from dark at the bottom to light at the top, not only because such treatment increases the apparent height, but also because it creates an illusion of sunlight, even on gray days. The spandrels are fluted terra cotta, of a dark chocolate color; sash are painted green. The coping between the piers is a black field with yellow border and orange background. Cast stone is warm limestone color, and was used principally for the sake of its contrasting texture. All colors, except variations of the basic colors, are brilliant and are used in small areas. The result is harmony without dullness.

The main entrances are recessed vestibules. The color scheme is that of the general exterior, but the use of marble and bronze here prepares one for the arcade and the richer treatment of the interior. The entrance frames and portico wainscot are the almost solid red Rosso Antico, with Kasota above the wainscot. The walls of the arcade are also of Kasota to the height of the display windows, and of plaster above. In the elevator lobby the Kasota is carried to the ceiling.

Photos. Sigurd Fischer

STATE TOWER BUILDING, SYRACUSE
THOMPSON & CHURCHILL, ARCHITECTS



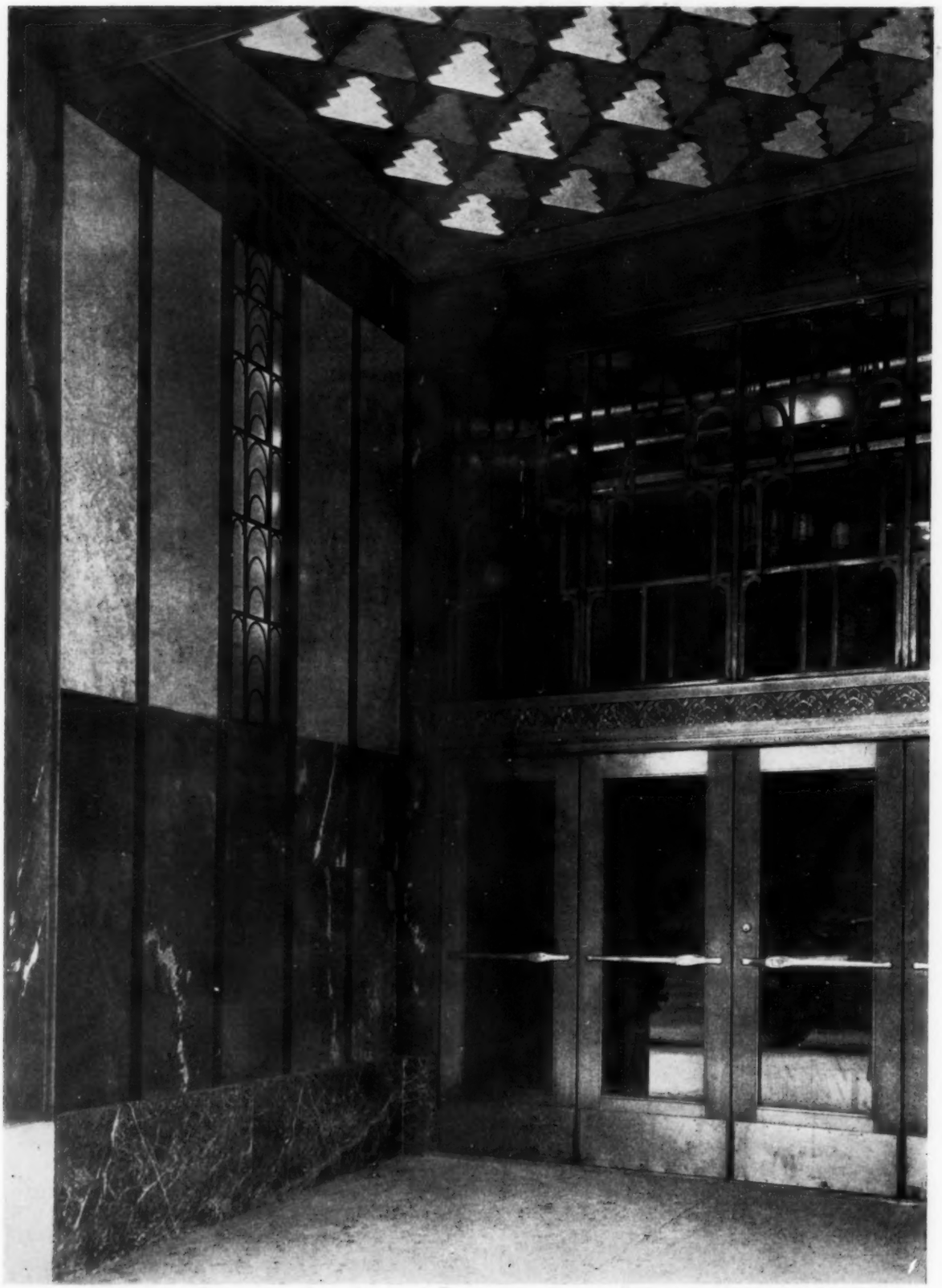
STATE TOWER BUILDING, SYRACUSE
THOMPSON & CHURCHILL, ARCHITECTS

ELEVATOR LOBBY

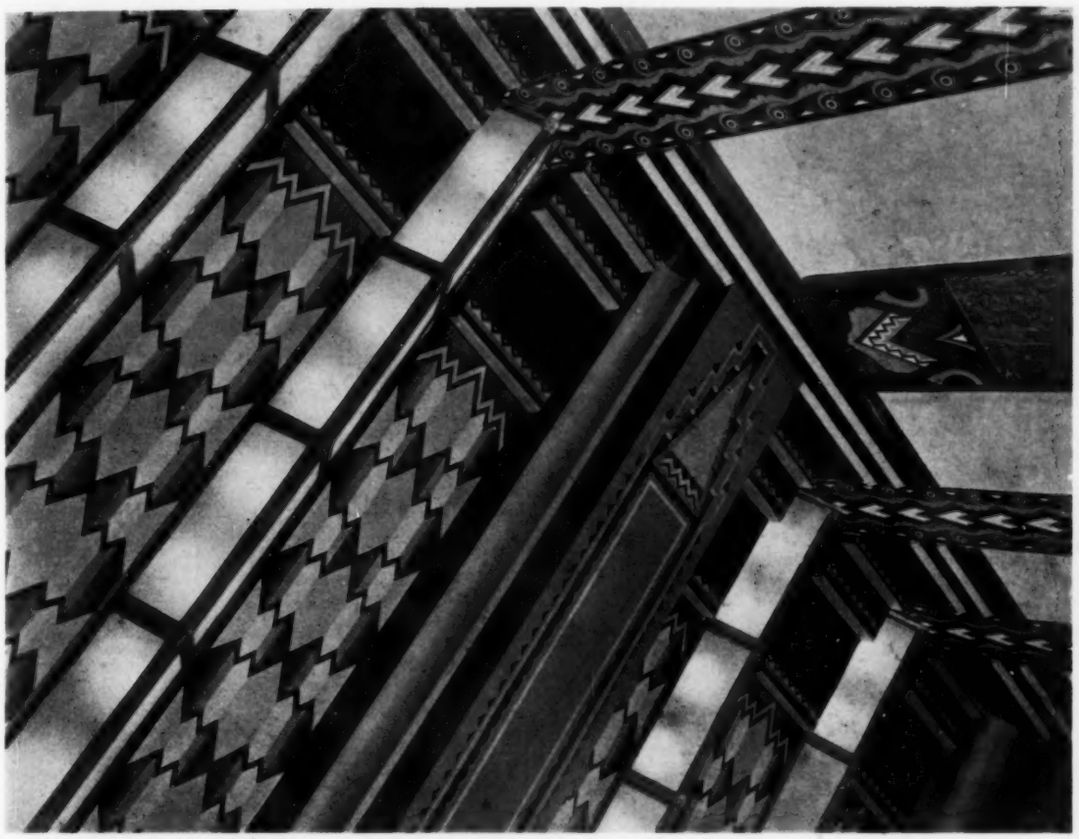
STATE TOWER BUILDING, SYRACUSE

THOMPSON & CHURCHILL, ARCHITECTS

ENTRANCE HALL
STATE TOWER BUILDING, SYRACUSE
THOMPSON & CHURCHILL, ARCHITECTS



OUTER VESTIBULE
STATE TOWER BUILDING, SYRACUSE



CEILING OF ELEVATOR LOBBY

CEILING OF ENTRANCE HALL

STATE TOWER BUILDING, SYRACUSE
THOMPSON & CHURCHILL ARCHITECTS

Mail Box in Lobby

Lantern in Entrance Hall

The pilasters are Tinos, as are the base and floor borders. The Tinos base is run out through the vestibules into the entrances, so that exterior and interior lead one into the other without sudden change. Enameled bronze caps, and enameled bronze strips above the elevator doors lend touches of brilliant color to the otherwise rather severe treatment. The use of enameled bronze is eminently successful. Except in the elevator lobby, color in the arcade is confined to the ceilings, so as not to interfere with window displays.

Every question affecting renting, management and maintenance was gone over with experts, and the building is "metropolitan" in its completeness and equipment. All offices have lavatories, and gas, compressed air and power are provided for doctors and dentists. Sash are of the projected type with the lower large lights stationary for display lettering. Venetian blinds are used. Roofs, except that of the garage, are tiled. Corridors are 8 feet wide, with terrazzo floors and marble wainscots. Permanent light is assured all offices. The garage, of the ramp and staggered floor type, accommodating about 150 cars and connecting directly with the main building, has been a large factor in the quick renting of the building. It is so isolated by fire walls that insurance on the office building is no higher than if there were no garage.

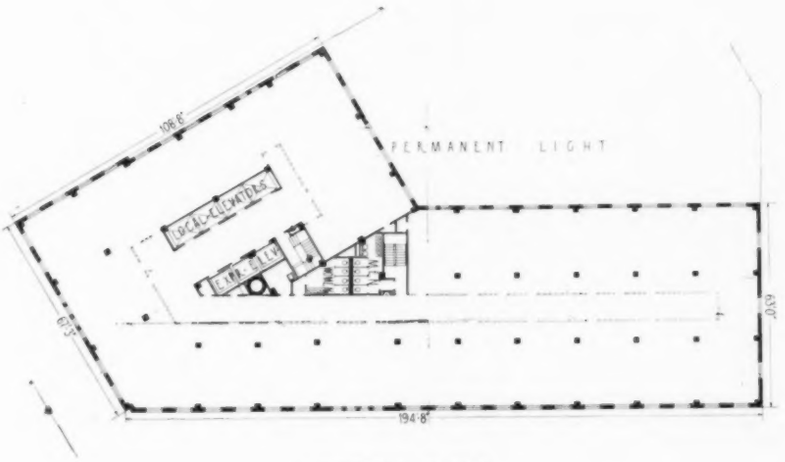
Editor's Note. It is an interesting fact that in Syracuse, as in many of the other smaller cities of the country, splendid examples of modern architecture are being erected. It is by mere coincidence that both the new Telephone Building by Voorhees, Gmelin & Walker in Syracuse and the State Tower Building by Thompson & Churchill in the same city happen to be shown in this issue of THE ARCHITECTURAL FORUM. Although quite different in their individual expressions of modern commercial architecture, each building is a splendid example of the freedom from precedent shown in the best of our recent American work. The word "modern" should be used in connection with such buildings as these only as it indicates the recent completion of them. All examples of architectural design as created in each successive year are "modern" in the sense of time. In our opinion, the expression "Modernistic" as indicating a distinctive and unusual style of architecture or painting is mis-used. The many examples of exotic and neurotic architectural design found today in the principal countries of Europe might be termed "Frenzied Architecture."

Photo. Sigurd Fischer

Plans on Back

STATE TOWER BUILDING, SYRACUSE

THOMPSON & CHURCHILL, ARCHITECTS



A TYPICAL FLOOR

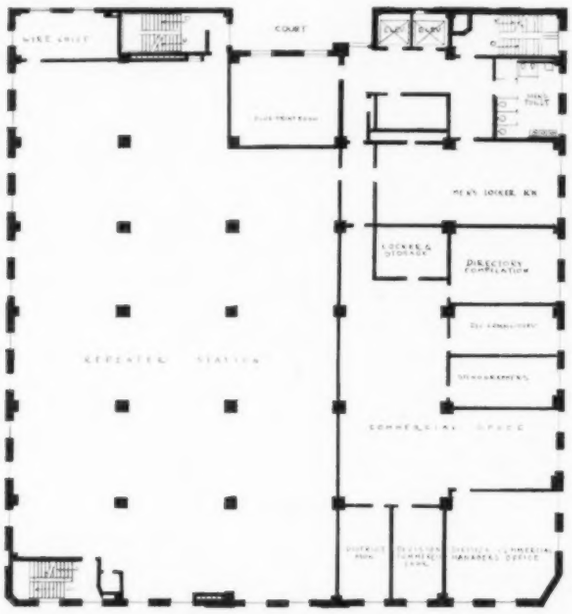
FIRST FLOOR

PLANS: STATE TOWER BUILDING, SYRACUSE

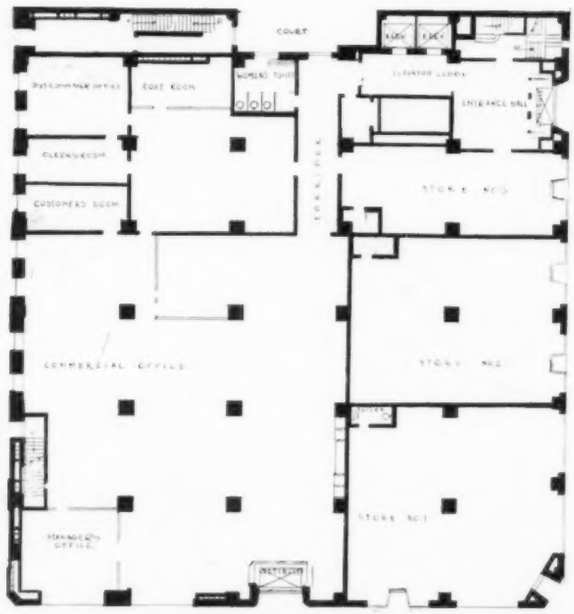
THOMPSON & CHURCHILL, ARCHITECTS

Photos. Ira Wright Martin *Plans on Back*

TELEPHONE BUILDING, SYRACUSE
VOORHEES, GMELIN & WALKER, ARCHITECTS



FIFTH FLOOR

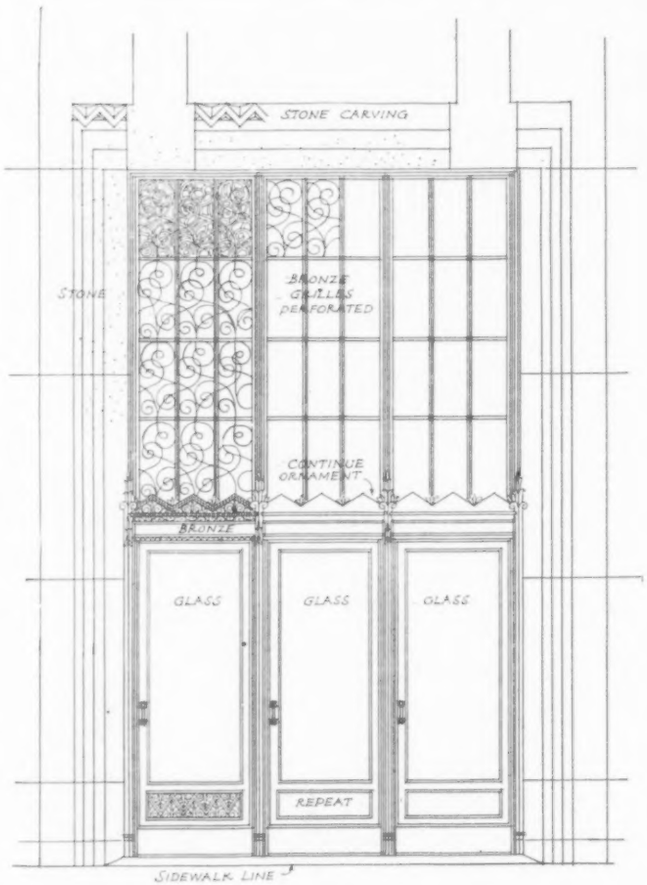


FIRST FLOOR

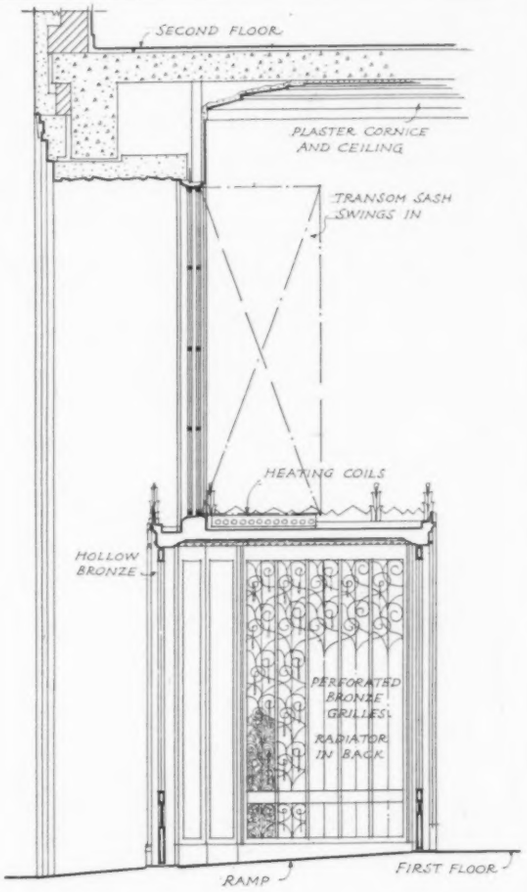
PLANS: TELEPHONE BUILDING, SYRACUSE
VOORHEES, GMELIN & WALKER, ARCHITECTS

Detail on Back

TELEPHONE BUILDING, SYRACUSE
VOORHEES, GMELIN & WALKER, ARCHITECTS



Elevation



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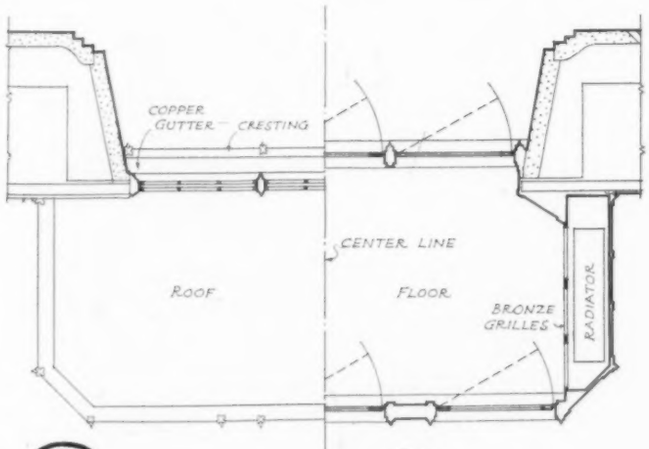

Plan

ENTRANCE DETAIL

THE NEW YORK TELEPHONE COMPANY
SYRACUSE, NEW YORK.

VOORHEES, GMELIN AND WALKER.
ARCHITECTS

JAN. 1929

No. 1

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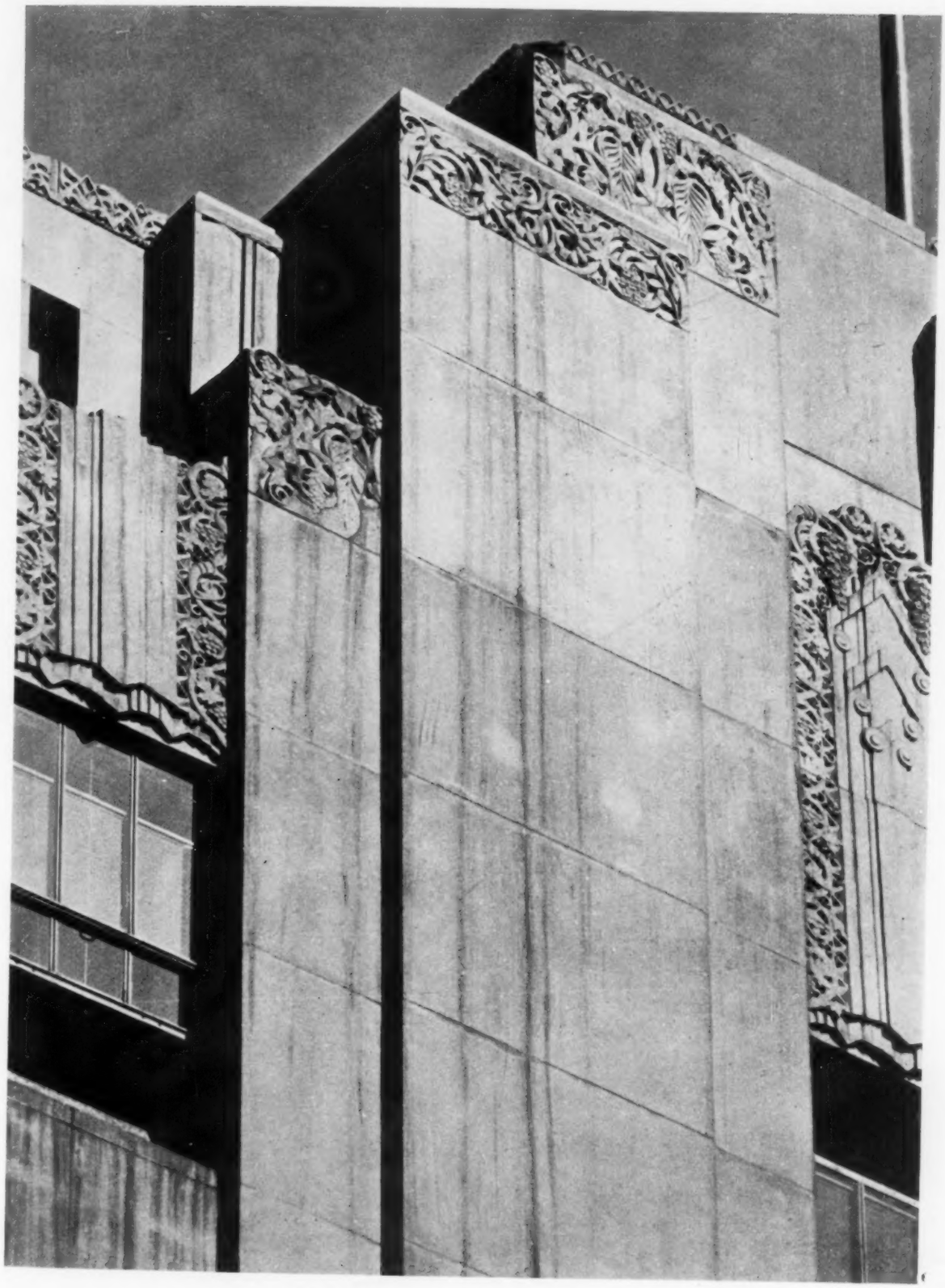
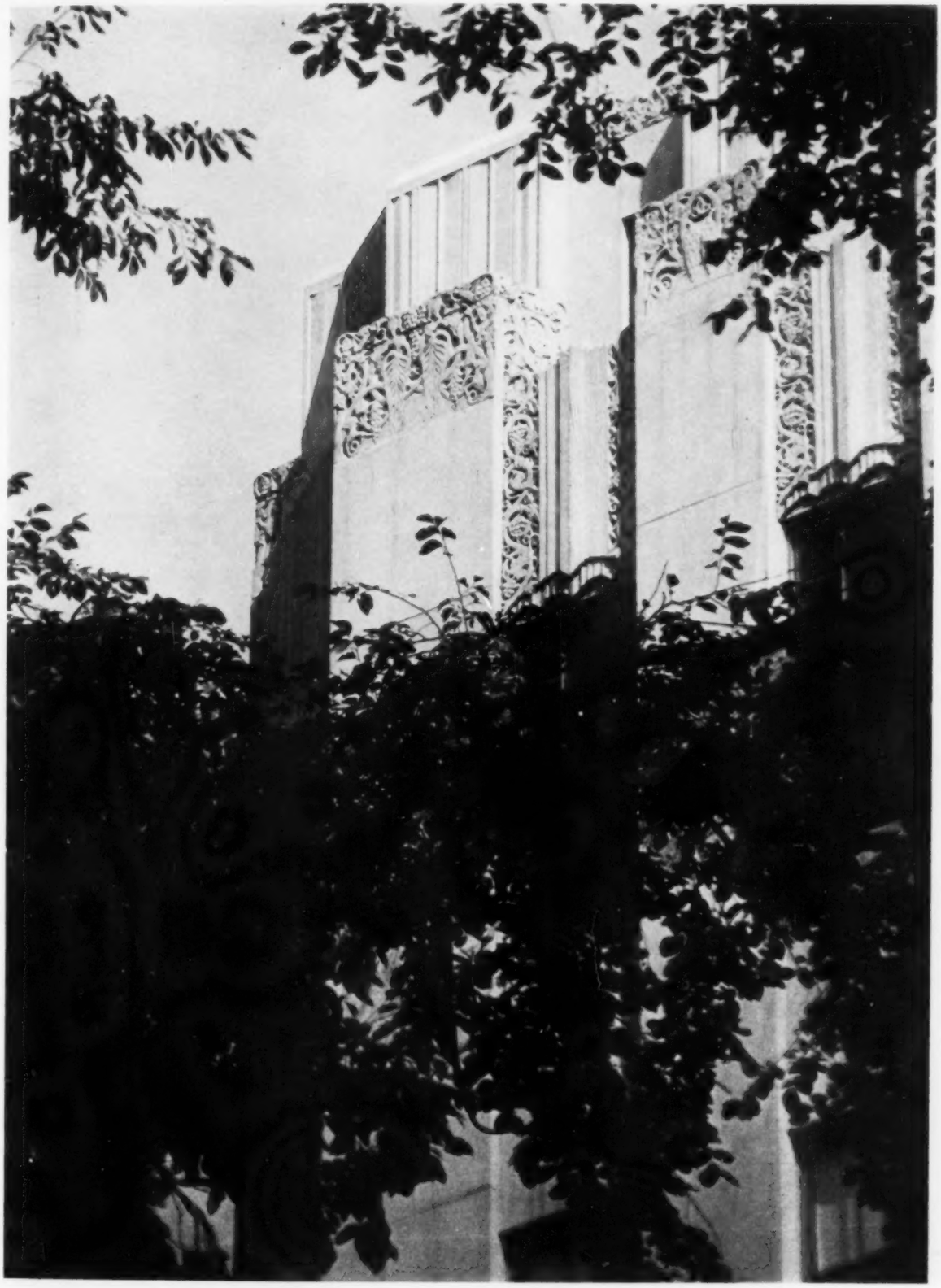
SCALE IN FEET

The ARCHITECTURAL FORUM DETAILS



TELEPHONE BUILDING, SYRACUSE
VOORHEES, GMELIN & WALKER, ARCHITECTS



TELEPHONE BUILDING, SYRACUSE
VOORHEES, GMELIN & WALKER, ARCHITECTS

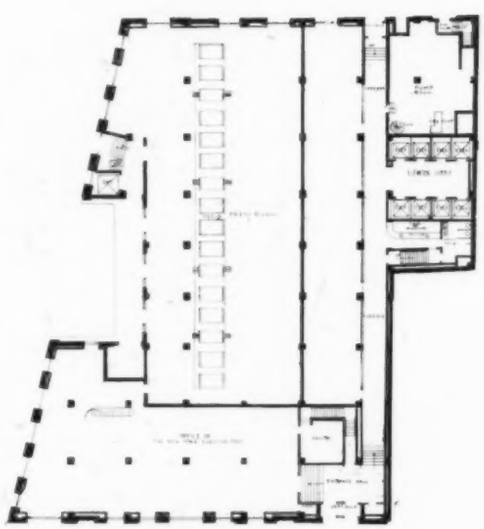
TELEPHONE BUILDING, SYRACUSE
VOORHEES, GMELIN & WALKER, ARCHITECTS

TELEPHONE BUILDING, SYRACUSE
VOORHEES, GMELIN & WALKER, ARCHITECTS

Photo. Wurts Bros. *Plans on Back*

EVENING POST BUILDING, NEW YORK
HORACE TRUMBAUER, ARCHITECT

A TYPICAL FLOOR



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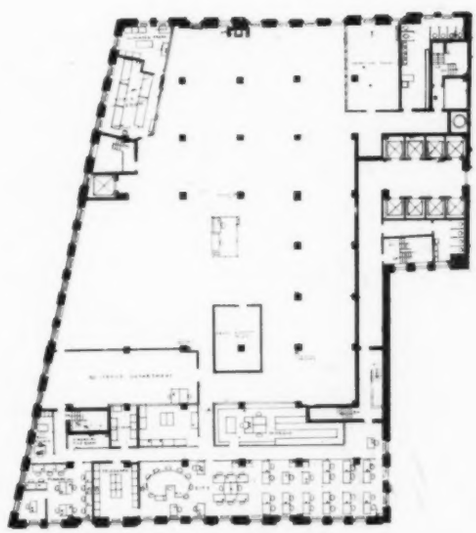


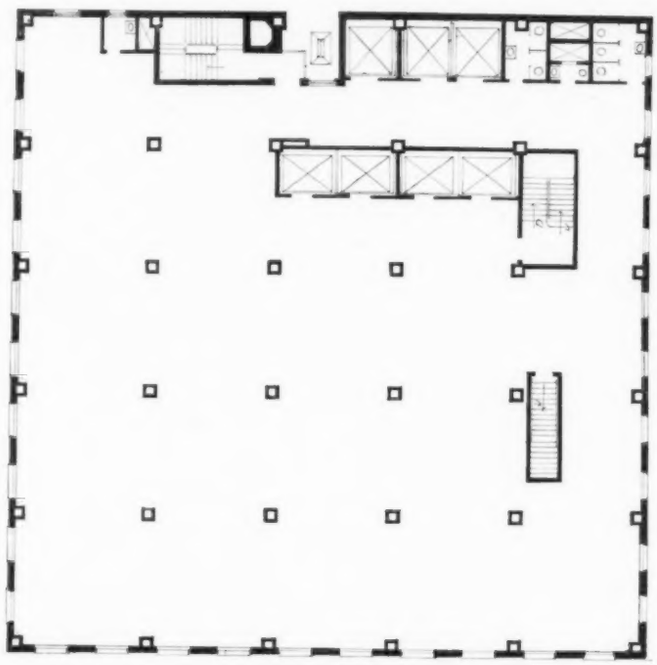
SECOND FLOOR

PLANS: EVENING POST BUILDING, NEW YORK
HORACE TRUMBAUER, ARCHITECT

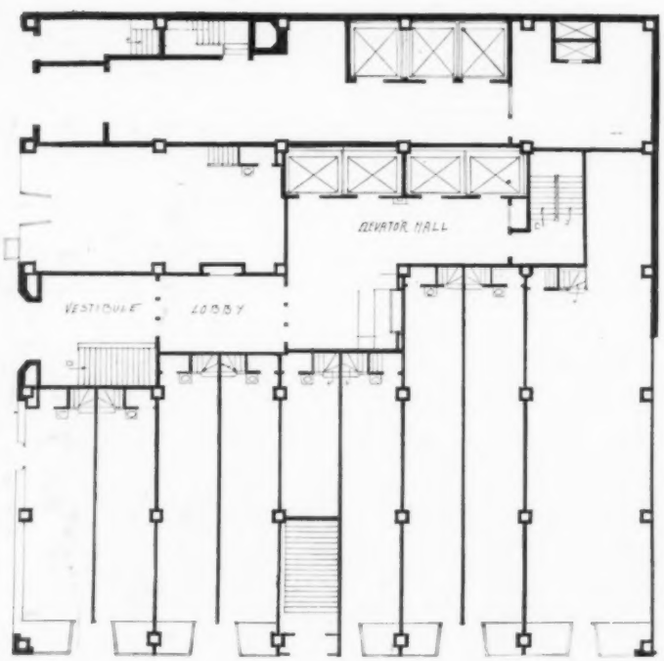
Photos. Sigurd Fischer *Plans on Back*

BUILDING AT CORNER OF SIXTH AVENUE AND 37TH STREET, NEW YORK

BUCHMAN & KAHN, ARCHITECTS

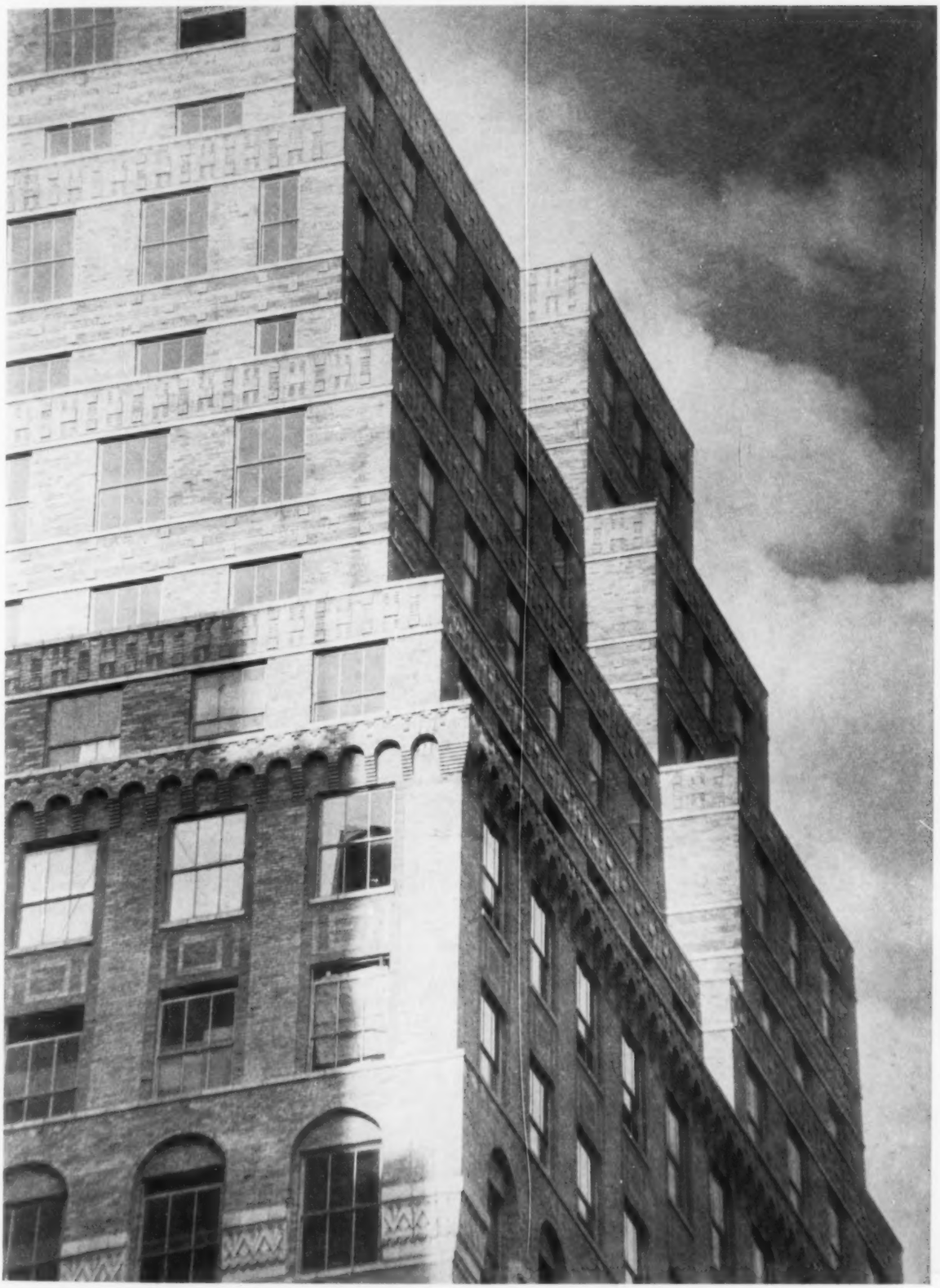


A TYPICAL FLOOR

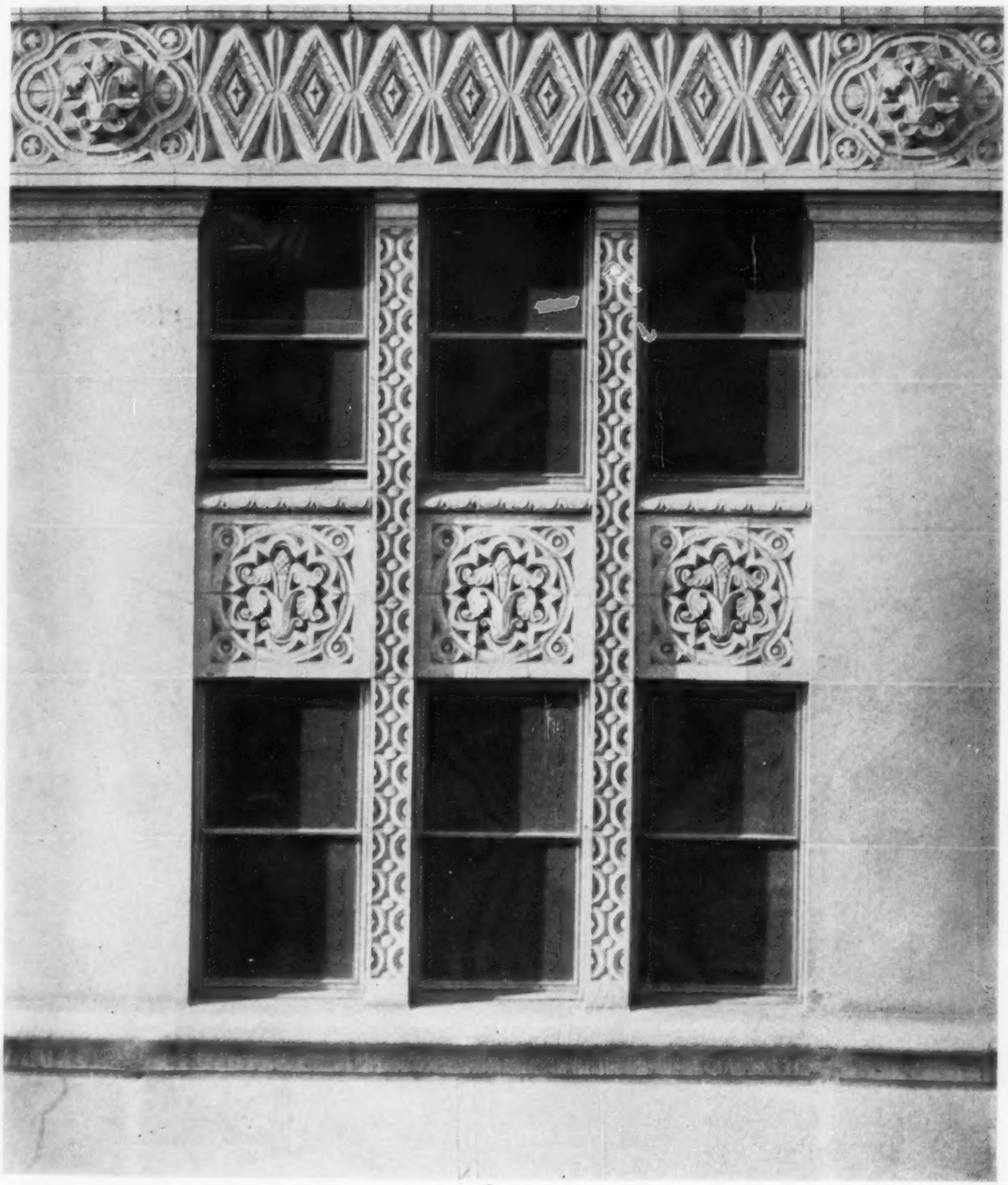


FIRST FLOOR

PLANS: BUILDING AT CORNER OF SIXTH AVENUE AND 37TH STREET, NEW YORK



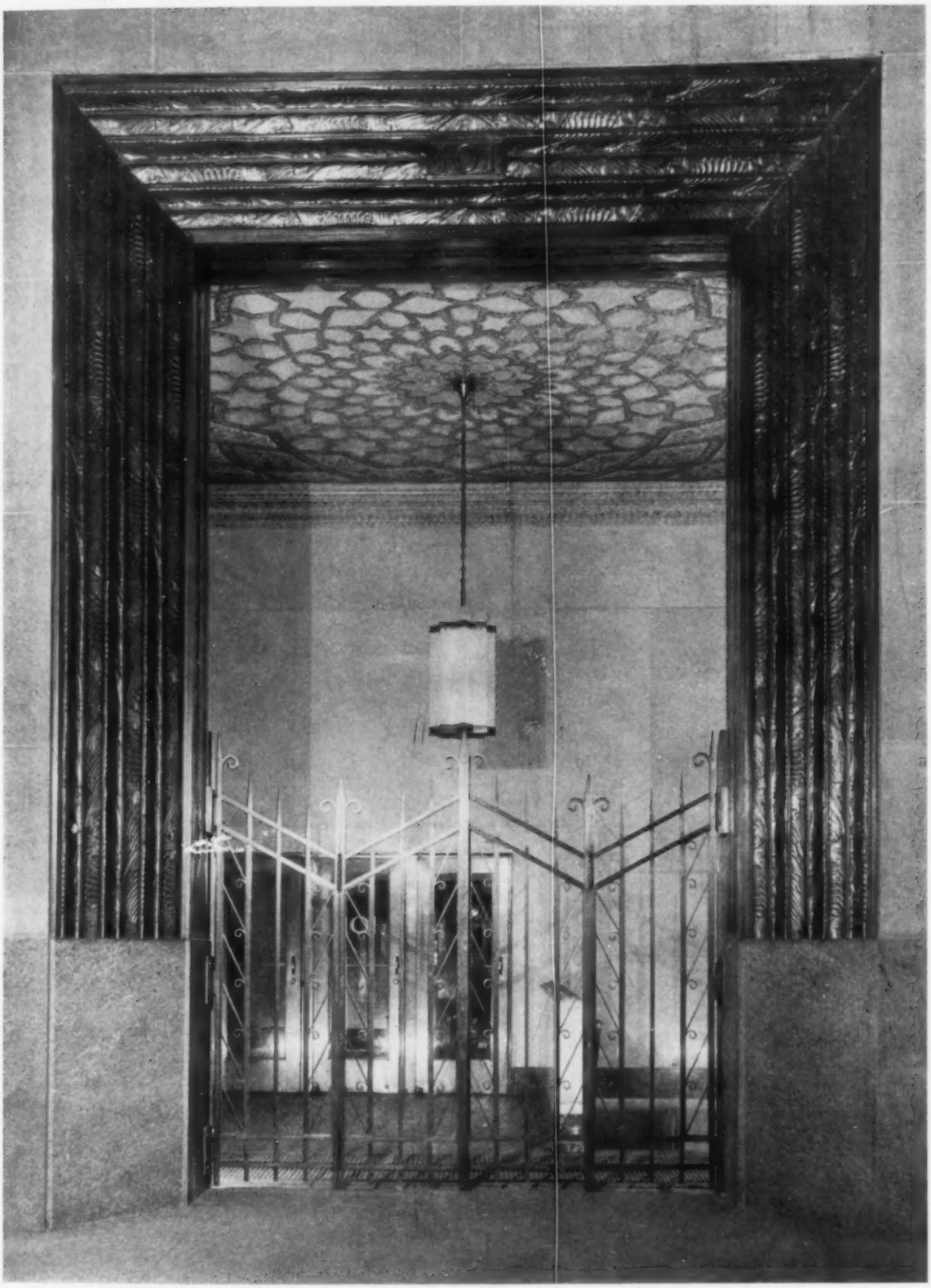
BUILDING AT CORNER OF SIXTH AVENUE AND 37TH STREET, NEW YORK
BUCHMAN & KAHN, ARCHITECTS



A DETAIL

BUILDING AT CORNER OF SIXTH AVENUE AND 37TH STREET, NEW YORK

BUCHMAN & KAHN, ARCHITECTS



MAIN ENTRANCE

BUILDING AT CORNER OF SIXTH AVENUE AND 37TH STREET, NEW YORK

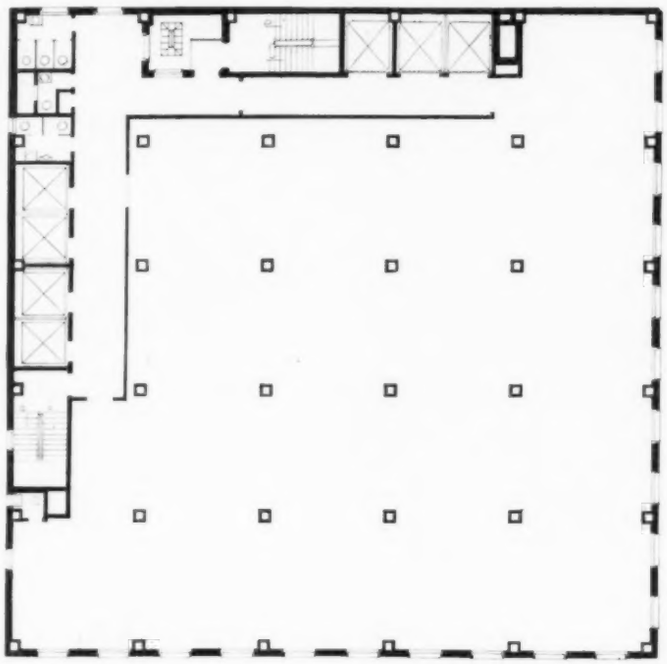
BUCHMAN & KAHN, ARCHITECTS

DETAIL, ARCHITECTURE OF ENTRANCE DOOR
BUILDING AT CORNER OF SIXTH AVENUE AND 37TH STREET, NEW YORK
BUCHMAN & KAHN, ARCHITECTS

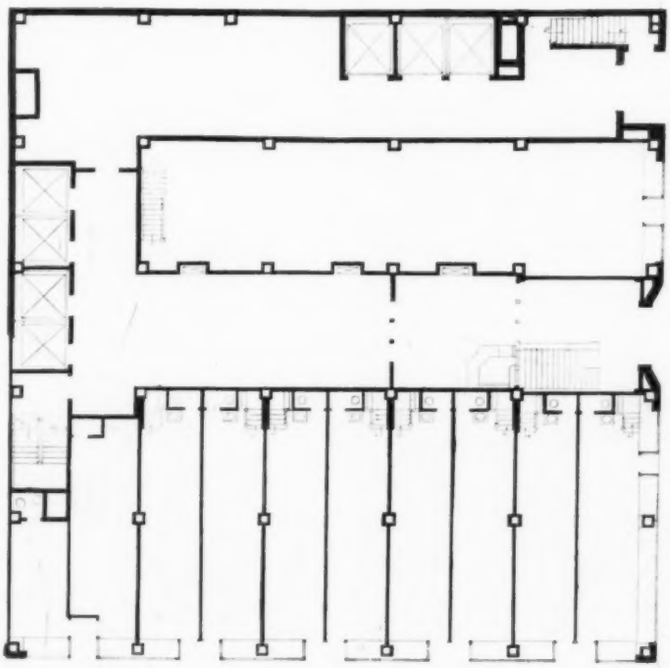
Plans on Back

MILLINERY BUILDING, SIXTH AVENUE AND 39TH STREET, NEW YORK

BUCHMAN & KAHN, ARCHITECTS



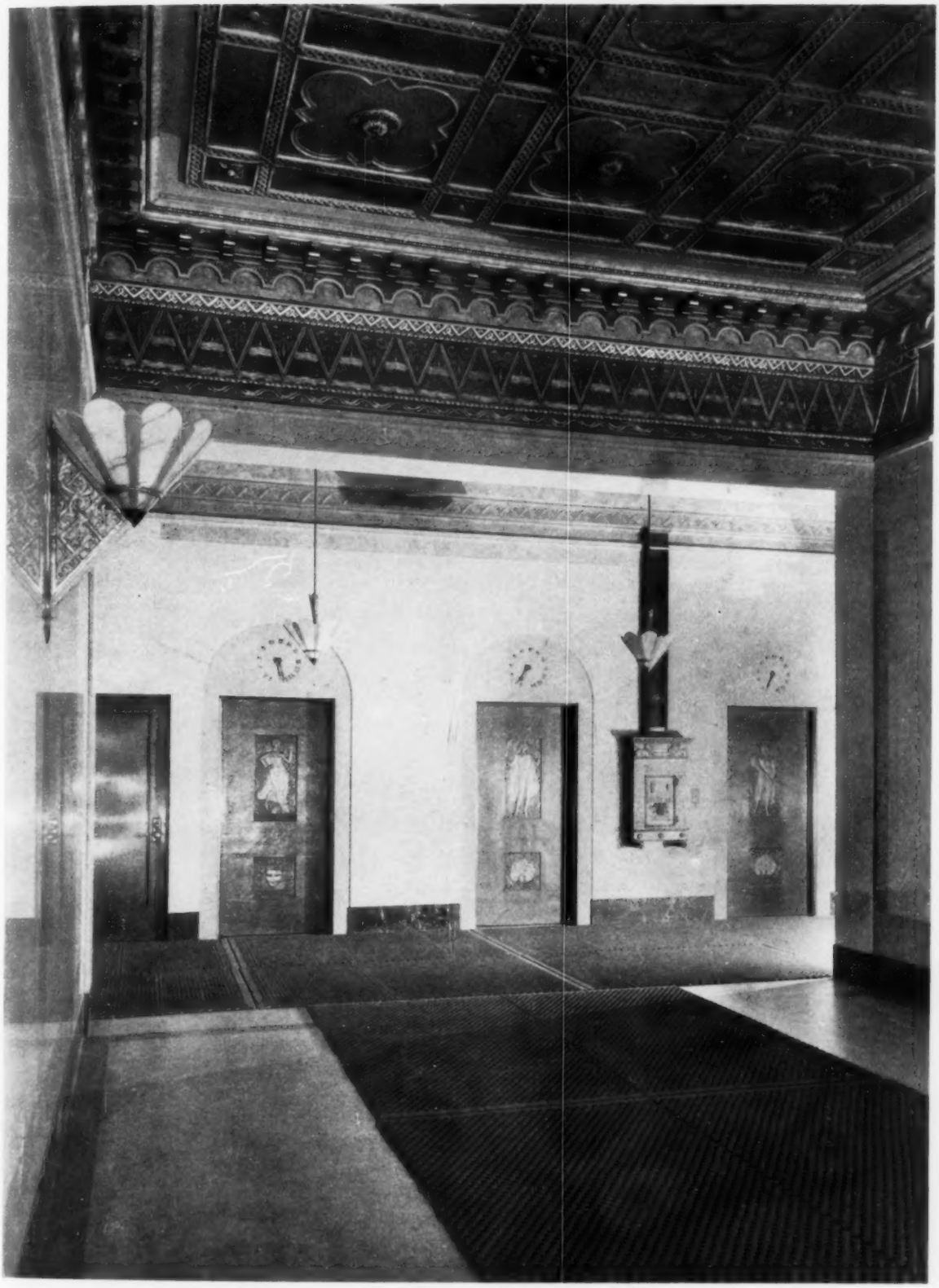
SECOND TO SIXTEENTH FLOOR



FIRST FLOOR

PLANS: MILLINERY BUILDING, SIXTH AVENUE AND 39TH STREET, NEW YORK

BUCHMAN & KAHN, ARCHITECTS



ELEVATOR LOBBY

MILLINERY BUILDING, SIXTH AVENUE AND 39TH STREET, NEW YORK

BUCHMAN & KAHN, ARCHITECTS

DETAIL, ELEVATOR DOOR

MILLINERY BUILDING, SIXTH AVENUE AND 39TH STREET, NEW YORK

BUCHMAN & KAHN, ARCHITECTS

RECENT EUROPEAN ARCHITECTURE

TEXT BY
RAYNE ADAMS
SKETCHES BY FRANCIS KEALLY

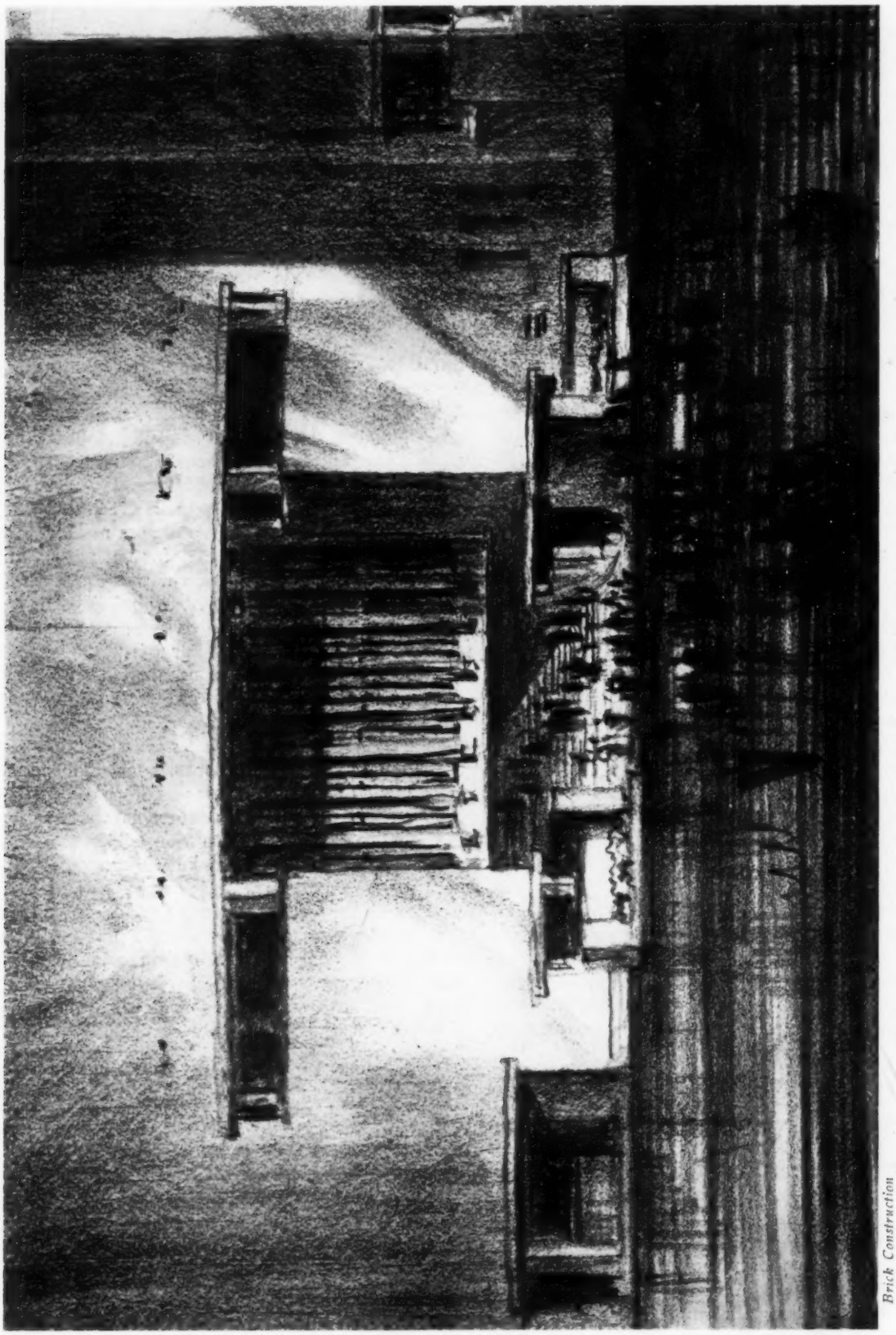
HOW many towns and villages have, among their various busy thoroughfares, one street which is marked by its decaying aspect,—its battered trees, sunken pavements and decrepit, unpainted houses! Yet, on the weathered signboard, the wayfarer may still read the mystic words "New Street." New it once was,—even as "Front Street," now a back street, circled the harbor line of the growing town. Every age,—every generation,—has its "New Street," along which its ardent youth runs. Every generation has its fling at "modernity." And, as the days lengthen into years, the "modern" quality in its work and thought becomes formulated,—and so it passes on, at times insensibly, without pains or penalties, into the great stockroom of the world's ideas.

"Modern." Perhaps the use of this word is inevitable in our attempt to characterize these successive outbursts of the creative instinct. A fatality in our common speech inheres in the difficulty of calling things by their definitive names. After all the child is usually born before he is named,—and good fortune does not always smile on him when the name is chosen! Among architects there should be no confusion, and yet there does exist such confusion as to what our so-called "modern" architecture exactly is; as to what it connotes and what are its formulæ; and the unhappy word "modern" is responsible for most of the confusion. One may justifiably believe that there should be a hospital,—even though it be only an illusory mansion of dreams,—for the repose of abused words. If we grant that the word "religion" should have the softest bed in this asylum, close beside it, in a bed almost as alluring, should be placed the word "art." And somewhere among those words broken and battered by the unrectified human conscience, we should find "modern."

The phase of art in which we are most interested here is architecture, and that particular phase of architecture which is known as "modern." Historically, we may limit the movement which has given us this architecture to the past 30 years, though it would be quite possible to trace its genesis to a much earlier period. Many and various are the sources of its being. One may mention as a cardinal influence the development of the use of steel construction,—accompanied by its thousand hand-maidens whose names, while perhaps not so appealing as those names which Rosetti held to be "five sweet symphonies," are nevertheless to be found gracing the ample volumes which go to making up "Sweet's Index" and those similar organs of enlightenment which every civilized country may boast. In other words, this is undoubtedly an age of engineering and sanitation, and it is from the fertile soil of great industrial achievement that the artist of today, as also the architect, may endeavor to draw his inspiration.

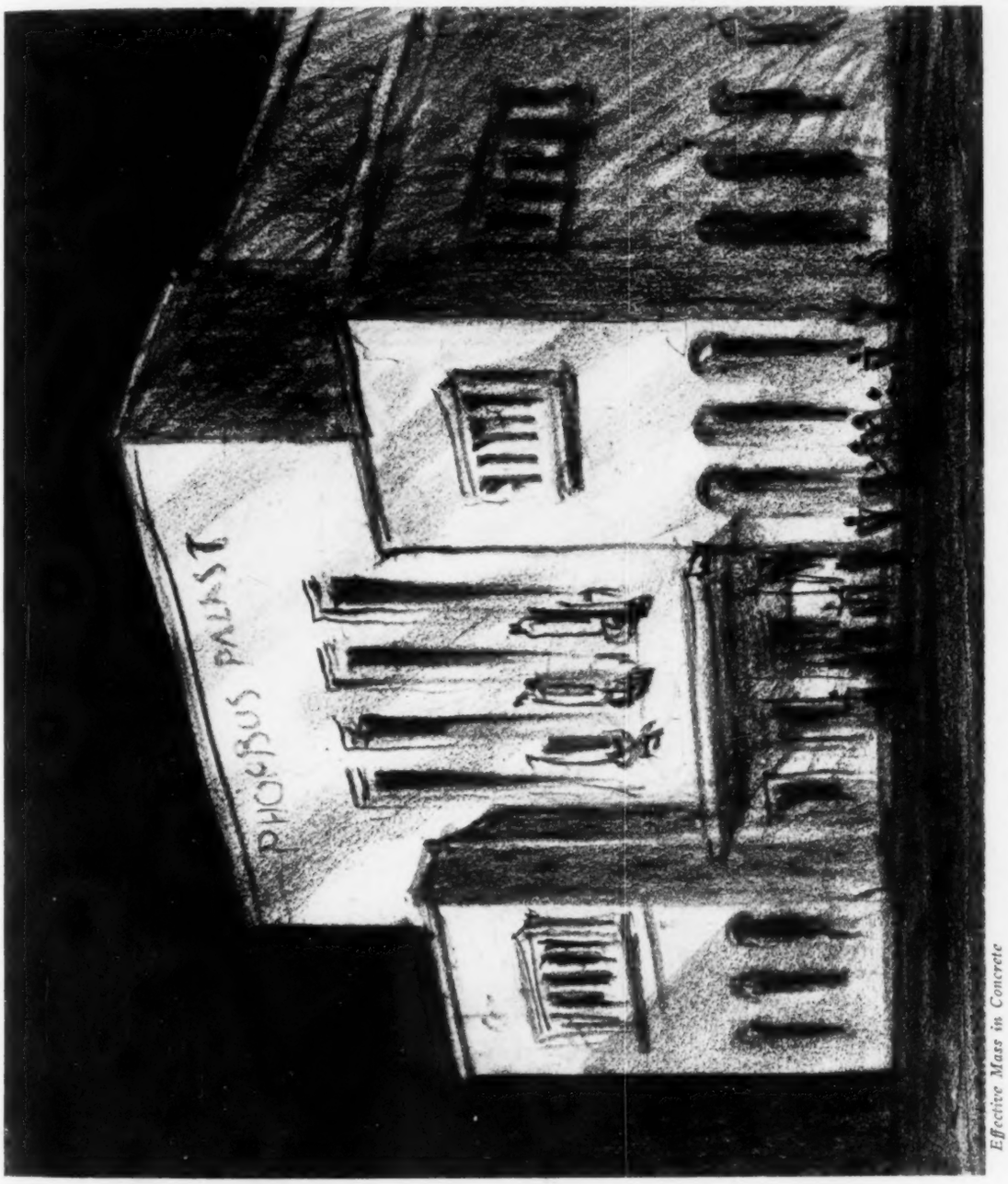
The illustrations accompanying this article are from sketches made by Mr. Keally during a recent trip to Europe, and the architecture, of which these sketches show representative examples, may bring to us interesting contrasts, if we view architecture sociologically. In the year 1800 there was, probably, little difference in the sanitary and housing conditions of Europe and those of America. Undoubtedly, in the larger centers, such as London and Paris, the standard of sanitation, of construction and of mechanical equipment was higher than in the United States, but in the 70 or 80 years which followed, this country made great progress in these matters. One of the factors making for this advance was the fact that for the most part Americans lived in impermanent wooden houses. The wealth of permanent, masonry buildings, common for centuries to all the civilized countries of Europe, was in itself a factor of conservatism, actually inhibiting the European from accepting or applying the improvements in sanitation and construction which the newly developing engineering and sanitary applied sciences were making possible. The population of America, moreover, was growing; new ground was being constantly broken; new habitations and towns were being continually thrust out into the wilderness,—or what had until lately been the wilderness. This elasticity, this movement, this necessity of finding new solutions, made it far more easy and natural that improvements in the so-called "practical" installations should find favor than could be the case in Europe, where every change meant the overthrow of some long-established custom. Europe was, and still is, "custom-bound." Sociologically it is important to note that even the French Revolution, which Mr. Buckle calls "the supreme event in history," was actually in its immediate outward effects, largely a Parisian affair; the bulk of the population of France held largely to its established ways of thought and habit.

For many years the taunt of the American tourist,—I speak of the superficial type,—was well known: "Europe may have the Louvre, but give me my bathroom with its modern plumbing." Well, the genius of the Louvre and the genius of the bathtub are not, necessarily enemies; and the present movement in housing and construction in Europe is going far to prove this. The great



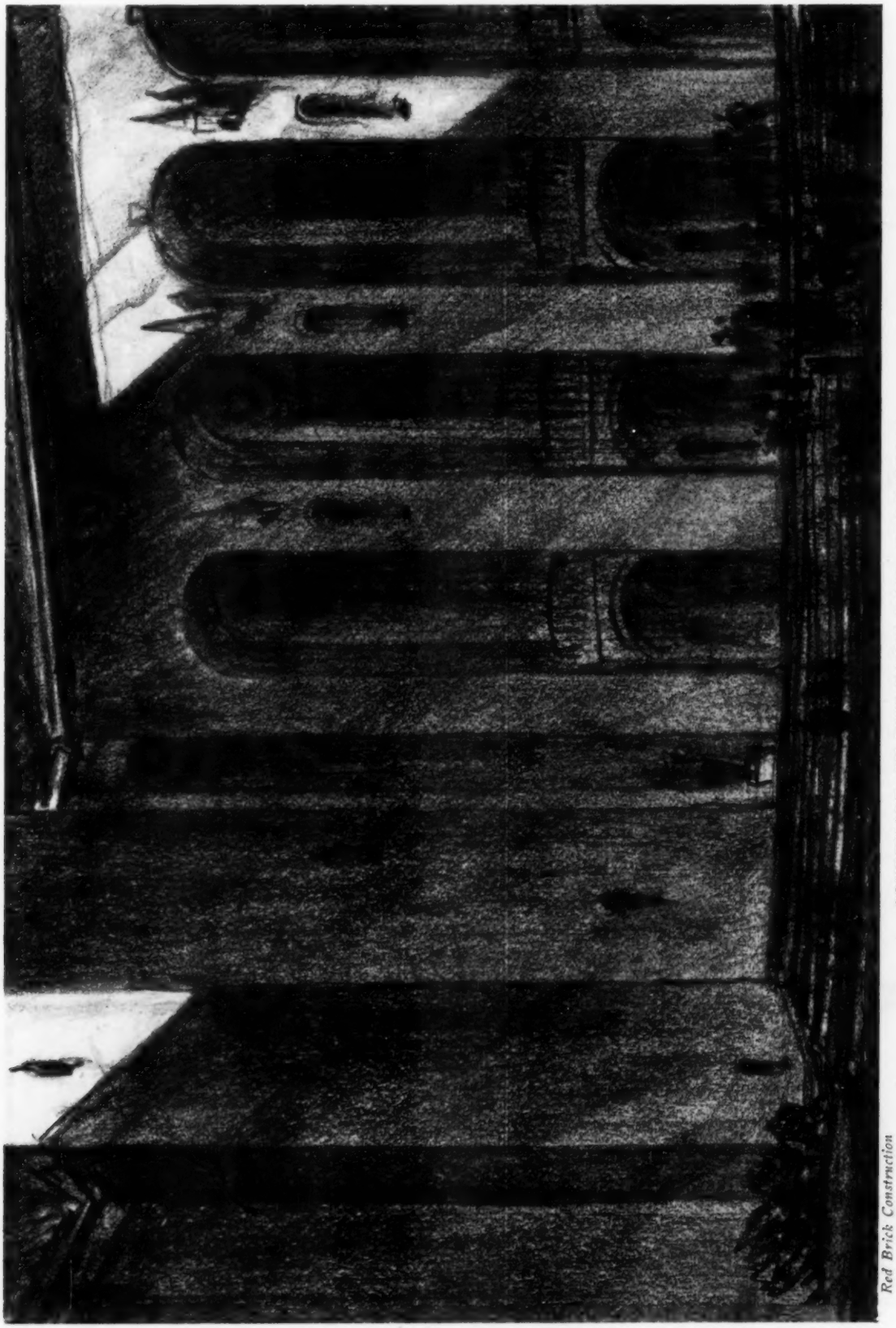
ONE OF THE SIDE ENTRANCES TO THE OLYMPIC STADIUM, AMSTERDAM

Brick Construction



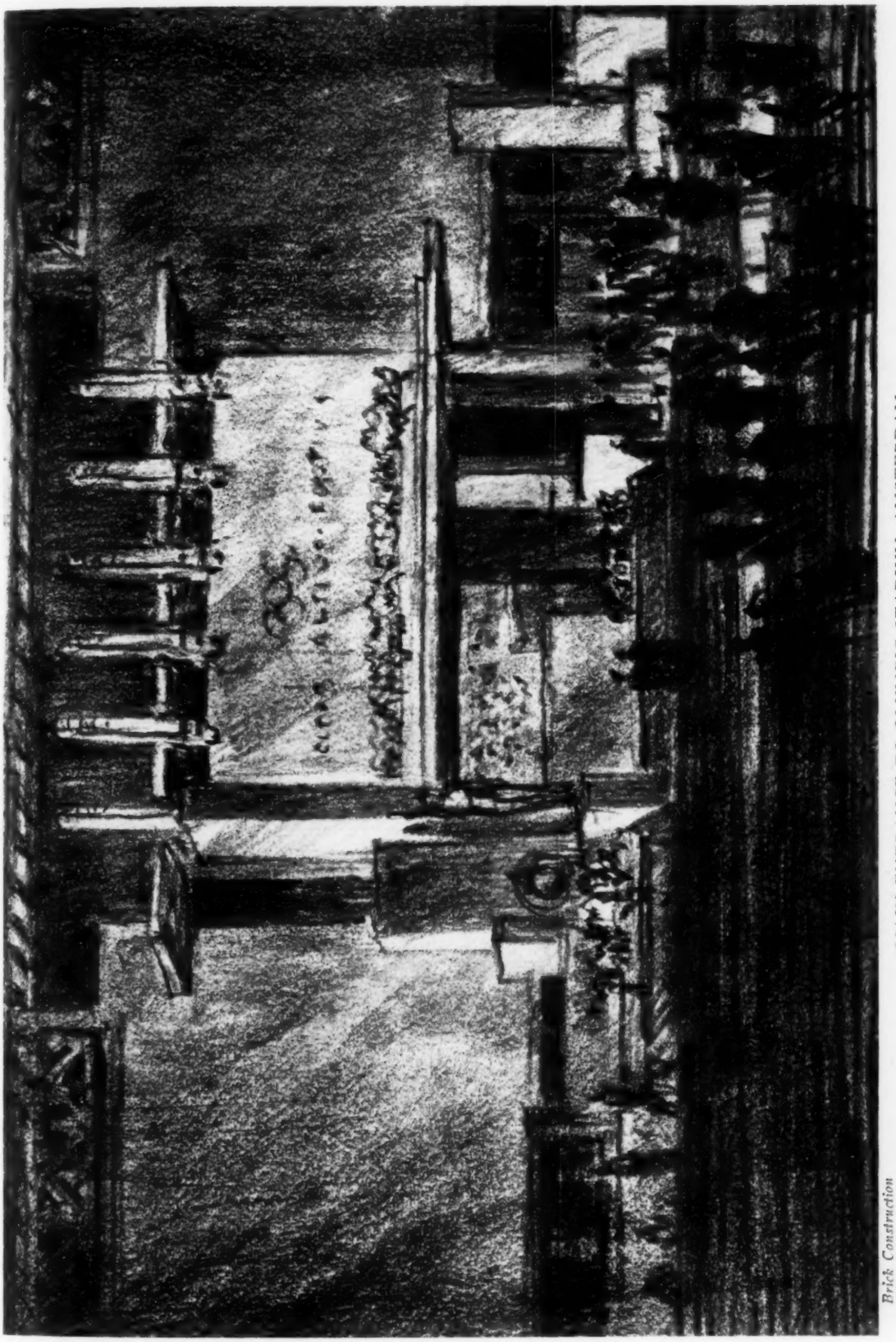
Effective Mass in Concrete

NEW MOTION PICTURE THEATER IN THE OLD TOWN OF NUREMBERG



COURTYARD OF THE TOWN HALL, STOCKHOLM

Red Brick Construction



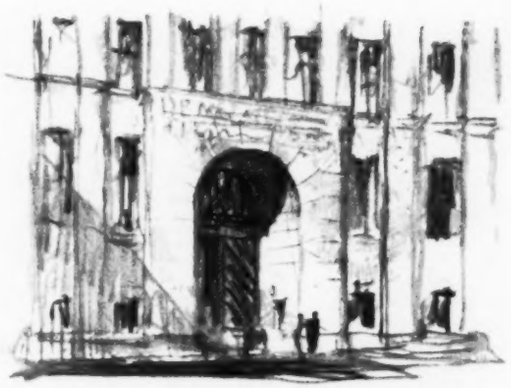
MAIN ENTRANCE TO OLYMPIC STADIUM, AMSTERDAM

Brick Construction

Mauve Colored Brick
"Chilehaus" in Hamburg

change, which came easily in this country and with more difficulty in Europe, was without question due principally to the perfection of the means of industrial production which the nineteenth century brought forth. In certain European countries, such as Germany, the scrapping of eighteenth century methods of production made more rapid advance, doubtless, than was made in England and France. And this industrialism has actually forced the older Europe to accomplish, in a relatively short time, somewhat of the transformation which extended over many years in this newer country. Even those among us of moderate age may recall the subsequent steps in the improvement of lighting. As a boy, you lighted your way to bed with a candle; the footlights in the theaters were (in the country) kerosene lamps; only such important buildings as the town hall could boast of having gas lights; the street corners were brightened by hissing arc lights; and, finally, the incandescent electric light proclaimed its ubiquitous supremacy. Modern Europe has, in its architecture, figuratively at least, leaped from the candle to the electric light without intermediate stages.

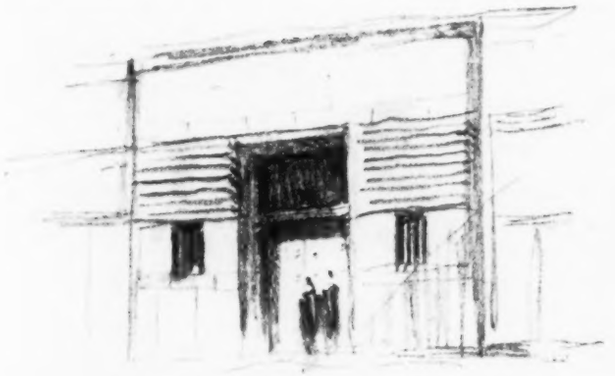
A review of the buildings built throughout northern Europe during the past 20 years brings to us sharply the realization that, under the ægis of modern construction and modern sanitation, Europe is making greater progress, relatively, than is being made in this country. The work of the



Cement Construction
Doorway to New Post Office, in Stuttgart

later architects in Europe, and especially of the protagonists in the development of the "modern" phase of architecture, has taken, as the expression goes, "the bull by the horns." They have consciously and effectively brought forth works of originality and genius, and they have done this because they have, at their best, succeeded in freeing themselves, not from the spirit of all precedent architecture, but in freeing themselves from the special vocabulary which, under the academic regime, had taken so strong a hold. It is this very expression of freedom which is least understood in America. In the minds of most of those who in any way follow the developments of the arts, the essence of protest which underlies all the special movements such as futurism, cubism, imagism,—and what not,—is not clearly perceived. The bizarre qualities of the work are noted, the hideous procession of monstrous emanations is observed,—but the significance of the protest escapes. When one, trained in the ancient usages of Greek, Roman and Renaissance architecture with their standardized forms, comes upon a collection showing examples of "modern" work, he suffers, generally, from shock. These buildings are to him revolting rather than otherwise. There is, of course, nothing strange in this; whatever is new shocks. And it is not necessarily a measure of praiseworthy perspicacity to join in lengthening the procession of things that are new; error and sham can be as "new" and "modern" as their opposites. What is wanted is the open mind.

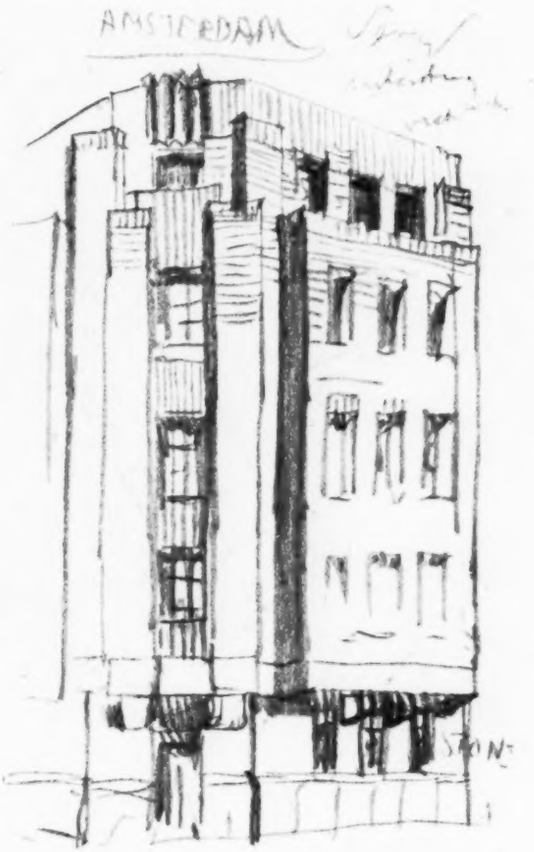
Perhaps there is room for disagreement, but I would suggest that, so far as "modern" architecture is a valid and conscientious expression of the architect's sense of design, there are no "new" principles involved. This very statement may, perhaps, seem to beg the whole question, because, if we were all as wise as Montaigne, we might question whether there



Combination of Stone and Metal

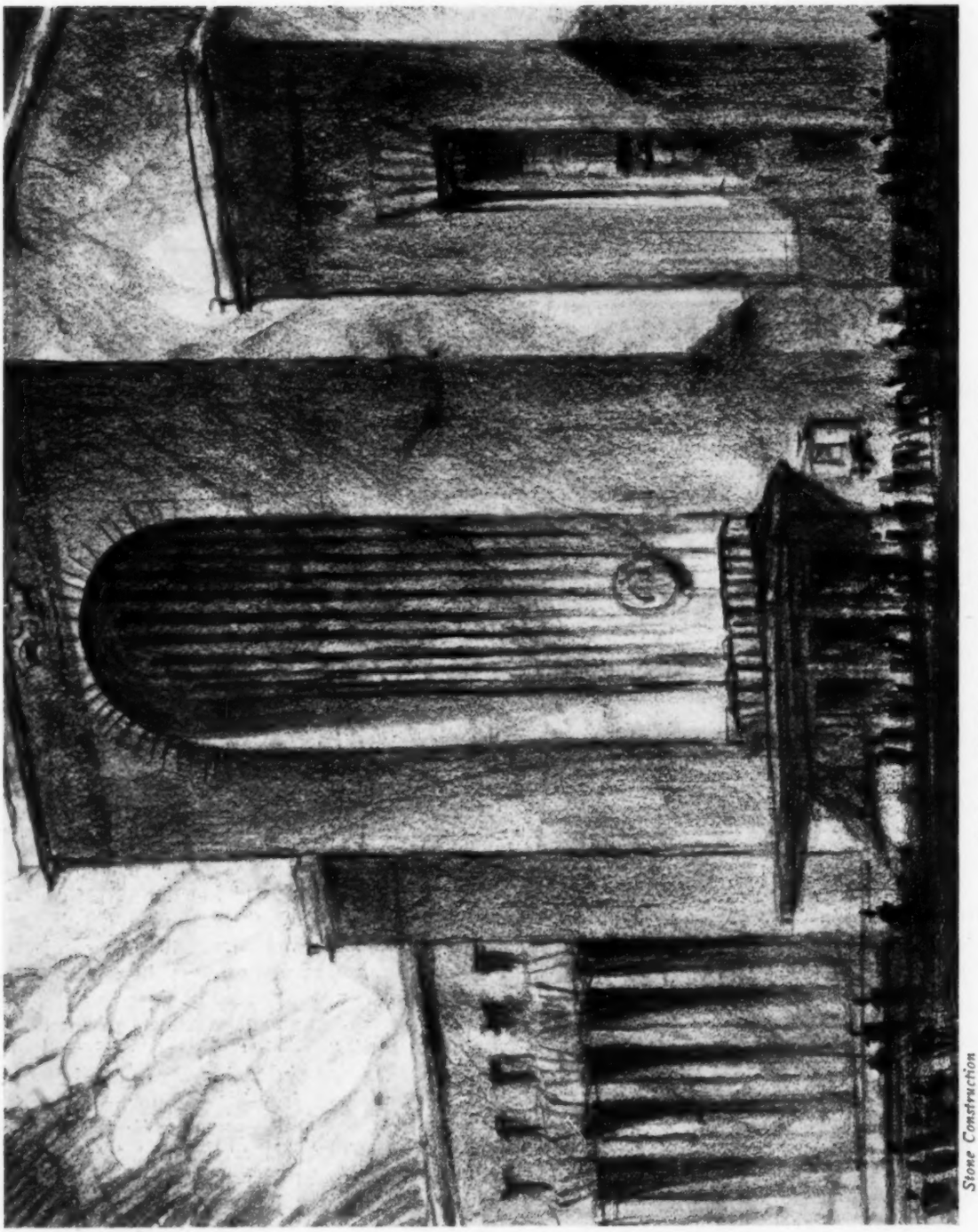
Modern Doorway to an Office Building in Berlin

are any "principles" of art or architecture at all, save those quasi-principles which we learned at school, even as our forefathers learned other "principles," only to renounce them in favor of still other "principles." Yet, one may hazard the suggestion that in the architects in Europe who have striven in their modern architecture for a pure expression of the conditions imposed by the exigencies of modern engineering there is, unquestionably, one outstanding thought,—or principle, if you will,—and that is that the design of the building should be evolved from the matrix of these conditions,—and these conditions are always local and special,—rather than that the design be achieved by trying to fit the conditions to the limitations of an architecture which belonged to a day that is dead. Even this generalization has its sharp-pointed restrictions. For it is possible to hold that the instant we admit the right of decorative forms to enter into the final expression of the work, we are admitting a factor which destroys the validity of the generalization. If we are to express modern requirements,—economic, constructional and other,—why should we search for a decorative expression at all? And if it be admitted that the decorative sense is, like all other senses, a part of Nature's self, and therefore entitled to recognition, where are we going to draw the line as to what part it may play in our design? Just because a porch roof may be supported by cantilever construction, is that an insuperable reason for so expressing the porch? Suppose the porch "looks better," as the saying is, with pillars,—shall we scrap the pillars just because we know that there is a cantilever buried in the hidden depths of the construction? And if we do use pillars, are we playing false or not? Must we, as subject to the Great Necessity, learn to consider the cantilever construction necessarily, —under these conditions,—decorative? Close questions these,—and who shall answer them? Not I, and, my masters,—saving your grace,—not you.



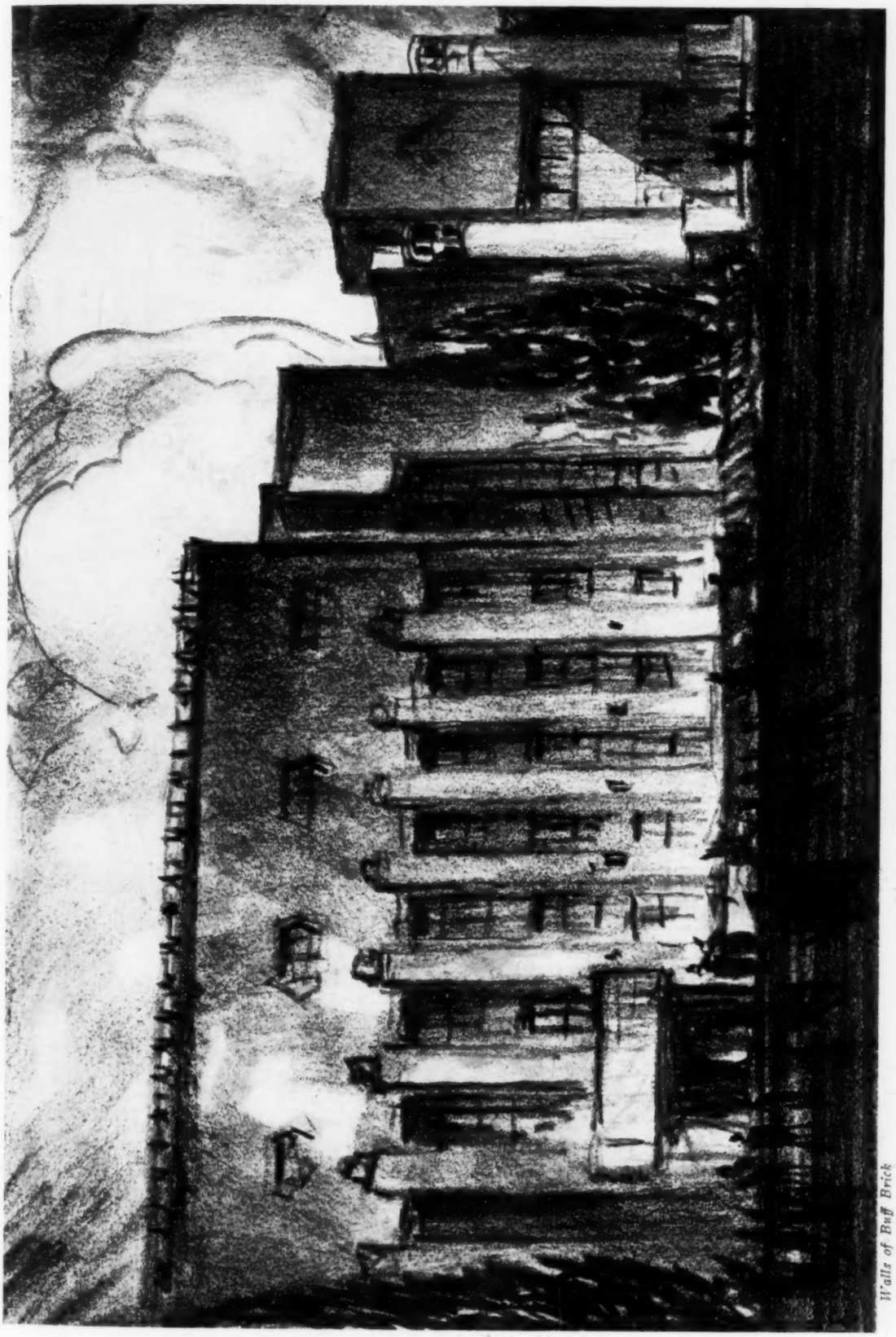
Treatment for a Corner Building in Amsterdam

The illustrations shown in these pages present sympathetic sketches of some of the buildings which have impressed Mr. Keally as most worthy examples of recent work. These buildings may be characterized, I am sure, as showing sincerity of purpose and ardent æsthetic desire. Their originators had, I feel certain, no desire to be bizarre; they have endeavored, simply and without equivocation, to let the design of their buildings be governed by their essential functions. Of course, there is nothing new in this attitude. Guadet and his long line of predecessors at the *Ecole* in Paris have taught the same gospel. If there is any difference in the methods of procedure between the "modern" architect and the architect of the older tradition, it is this,—that the academic architect works out his plan always bearing in mind certain classic proportions, so that his points of *poche* shall, when the elevation comes to be drawn, give his wall openings, his arches and his columns the sanctified academic proportions, whereas the "modern" architect tries to forget this vocabulary and lets his wall openings take care of themselves, feeling confident that if his plan can meet the construction and functional needs, he can find a way to make his wall openings and supports attractive, whatever their proportions may be. I do not mean to imply that his thought process



NEW RAILROAD STATION AT STUTTGART

Stone Construction

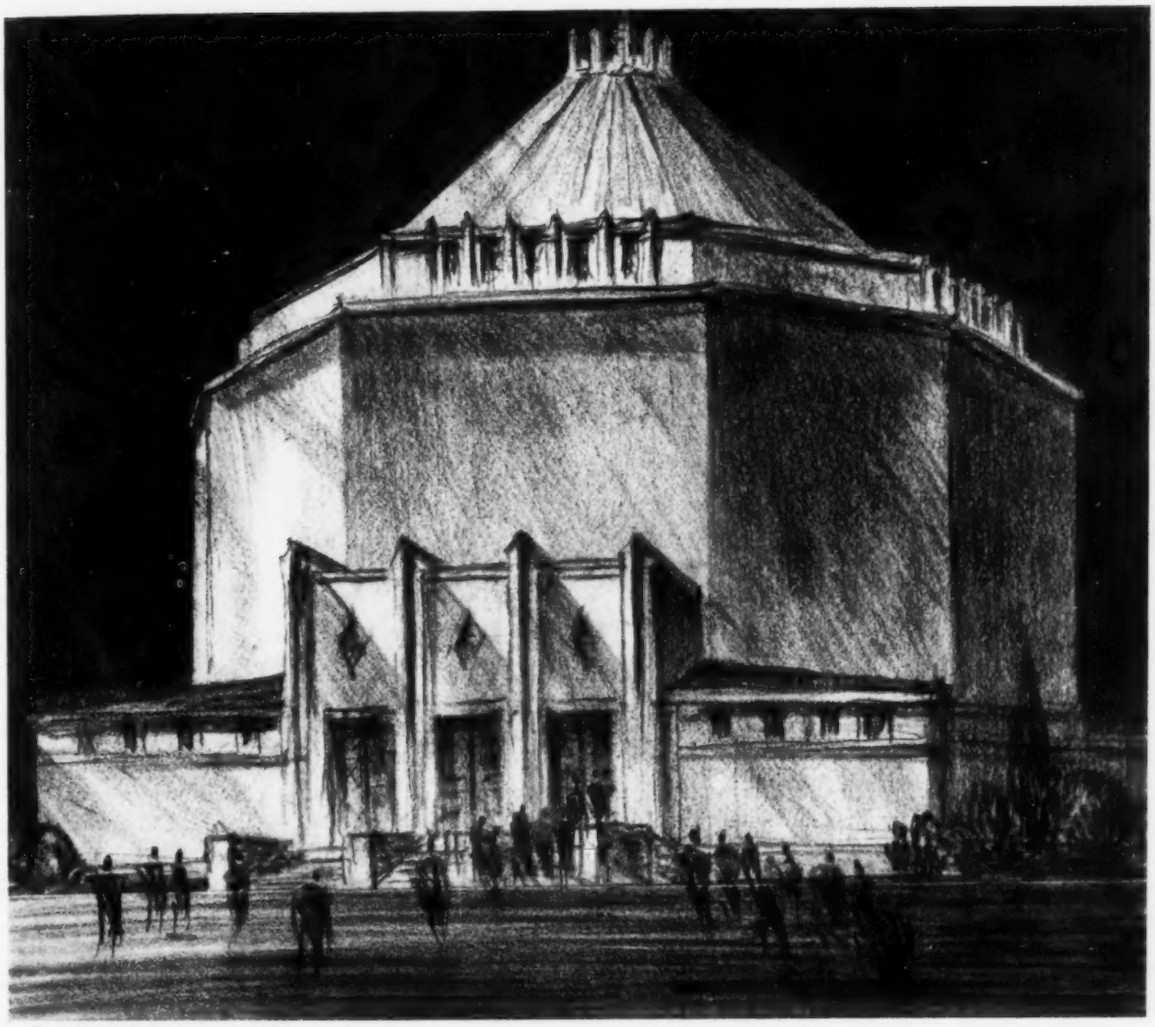


A MODERN HOSPITAL IN AMSTERDAM

Walls of Buff Brick

Red Brick

TOWN HALL, STOCKHOLM



Cement Building

New Planetarium in Leipsig

is quite helter-skelter; in terms of his genius he may visualize his section and elevation as he works out his plan, but, again in terms of his genius, he visualizes new solutions for these elements.

The architects whose work is characterized as "modern" have chosen the path which seems to them to lead to freedom. They are willing to consider any solution, yet, being intelligent, they,—or some of them,—are not willing to accept any solution. They may originate new forms and new disposition of masses,—but this type of magic is not original with them. The originator of these forms, always in terms of his æsthetic genius, may produce results which are pleasing to his taste and to the taste of certain others. How many he pleases or displeases is irrelevant. The empire of art is an organization in which the ruler and the ruled are one. The instant, however, he consciously formulates his art in canons, or as soon as the canonists arrive to dismember his work, a style is founded, his work is academized, and all the beggaring limitations grow into a school of art in which the disciples desecrate the memory of their master by imitation of his manner,—losing sight of the fact that to emulate him they should be different from what he was.

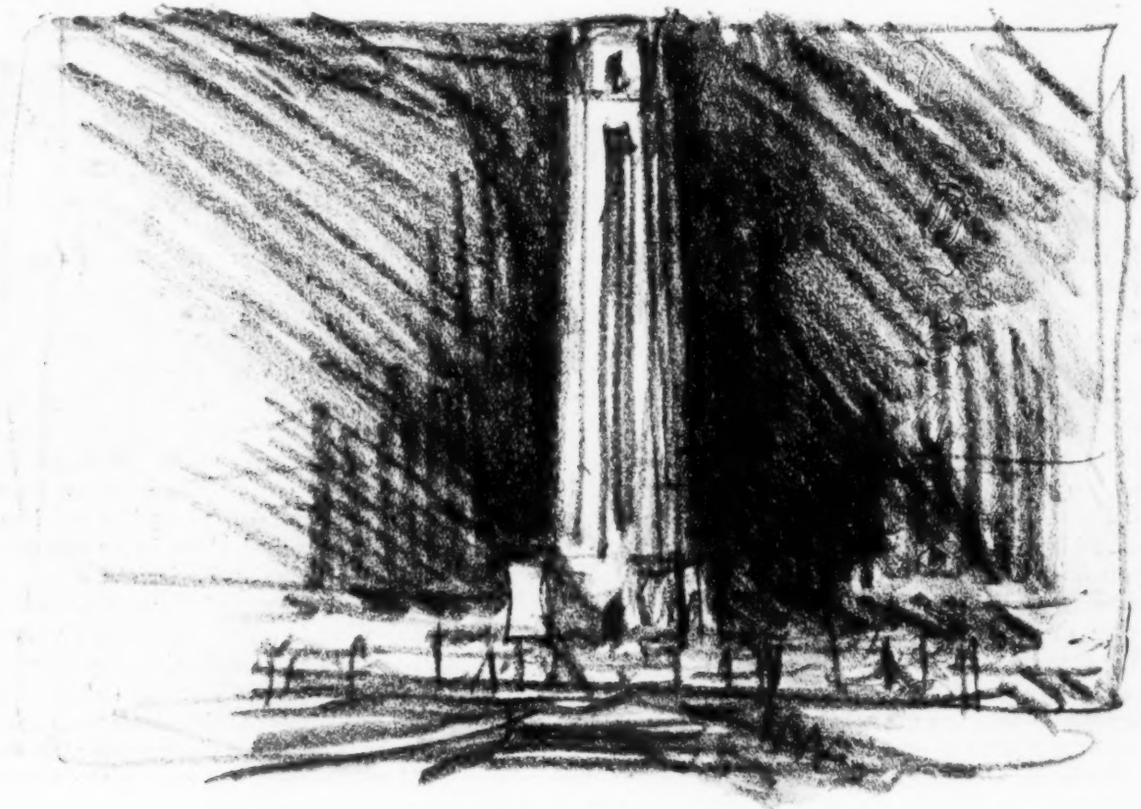
Well, what of it? A great deal. Have we, under the regime of our industrial Frankenstein, time in which to be original and different? Under the actual pressure of our modern life, how many architects can afford to take the road to freedom? How many, economically hedged in by the complexities of their professional life, can afford to differ? We see about us today many architects who are doing what is called "modern" architecture,—but, as a matter of fact, they are more or less servilely copying their European *devanciers* just as their predecessors, decades ago, copied Cæsar Daly. Is there any difference of attitude?

I do not know whether or not in the distant future our economic conditions will so change as to permit a more ample freedom, nor have we any

All Metal Front
A Perfume Shop in Paris

A Monument in Hamburg

assurance that the architect of the future will have either the desire or the power to take advantage of a larger freedom. That they may is, naturally, the hope of all men who believe with Professor Bury, in the theory of progress. As the situation stands today, we may be cheered by the fact that some architects, like some philosophers, manage, in spite of the crushing conditions of our daily life, to think and dream,—free, in some way, from the inhibitions which master the great majority.



Suggestion for a War Memorial

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS

BY

MATLACK PRICE

OF this house at Lake Forest for William McCormick Blair, one might well say that it has achieved all the storied charm of a venerable ancestral home, traditioned through generations, with all the comfort of the modern country house, studied to the last degree for today's most exacting demands for convenience. For this type of house we dwellers on the Atlantic seaboard must be conceded to be intimately appreciative. We must be conceded to have traditions, to sense the authentic architectural expression against the counterfeit, to be, perhaps, narrowly over-critical of the result when we see a house built in the image and likeness of our cherished Colonial in a spot sufficiently far west to have been virgin forest, not even a frontier, when Boston and Newport and Philadelphia were important cities of the colonies. But here is a piece of architectural handiwork that re-creates our Colonial mannerisms of the Atlantic seaboard far more intelligently and with more real authenticity than any but the best of our own efforts. It derives in part from Pennsylvania and in part from New England, with a third element of its own personality which unifies it and makes it a fine piece of work in its own right, supposing it to have had no definitely stylistic origins at all.

The architects have given us an excellent demonstration of the truth that the true old Colonial houses, for all that they developed certain identifying traits, were by no means all alike, and certainly not all "typically" Colonial, if we take typical as meaning built on a formula. Many of the finest houses of the colonial period were built on no formula at all. Many were remarkably individualistic, and grew from generation to generation into structures of rambling charm, with successive additions. Such a one this Blair house might well be. The rough-cast stonework, and the split stone, unwhitened, suggest the older houses of Pennsylvania, where the Welsh settlers brought with them their ready skill as stone masons. The gambrel roof of the main mass of the house has a New England manner, from where, too, might have come the hand-split shingles. These, by the way, illustrate the importance of thoroughness in any adaptation of a historic type. It is not enough to copy forms. The materials of the original, as well, should as nearly as possible be simulated. And the hand-split shingles are

Photos. Trowbridge

Entrance Front
House of William McCormick Blair, Esq., Lake Forest, Ill.
David Adler and Robert Work, Architects

exactly the right thing here not because (merely for a tricky effect) they are hand-split, but because they give precisely the effect of the old houses for which such shingles were the only kind obtainable. They have the irregularity that all hand-made things possess, and that is an essential factor in recreating any old type of building.

There are about this house few of the obvious things that many lay observers with a smattering of architecture would expect to find in what they would call a "Colonial" house. There are no "pillars;" there are no spindle railings; there are no fanlights or Palladian windows. For all of these omissions it is more truly Colonial than if it had all these things which came in later with the more sophisticated Georgian period. And this is equally true of the interiors, which the writer feels qualified to appreciate fully because of a summer spent in making measured and full-sized drawings of the interiors of several pre-Georgian manor houses in Rhode Island. In all this early Colonial interior detail there was a peculiar kind of primitive purity unlike any of the more scholarly work that came later. The scale was more generous; panels were sunk deeper; the mantel shelf had not come to be an inevitable part of the fireplace; there was a naïvete that was never clumsy and never too stylized. And much Georgian work, even when it is very beautiful, loses in charm what it gains in perfection.

This early Colonial interior woodwork has never been better understood or better done than in these Lake Forest interiors. Simple mouldings frame the fireplaces; simple cornices finish off the paneling, and the divisions and proportions of the paneling have the same fine simplicity. The very broad panels are essentially characteristic of the early work, and so is the generally large scale of the mouldings and the panel bevels. There is much work like this in the earlier Pennsylvania houses, and some also in New England, particularly in Rhode Island. The paneling, and especially the double pilaster caps in the dining room, are almost identical with the paneling and pilasters in the parlor of one of the finest old manor houses in the Narragansett part of Rhode Island. Another identical device, and one very characteristic of early Colonial woodwork, is the breaking out of the cornice over all pilasters and keystones. Inside or out, wherever this house departs from definite precedent, it departs in a thoroughly logical and consistent manner, because the architectural technique is consistent. The whole house is a monument to consistency, and nowhere does there seem to be any straining for effect, no forced issues. It all looks as though

Living Porch
House of William McCormick Blair, Esq., Lake Forest, Ill.
David Adler and Robert Work, Architects

it has been done easily; there is no feeling of effort, of painful re-construction from books and plates, and this is a trait of the best architecture there is,—and the best art.

Everything about this house seems to be in perfect keeping with everything else, and essentially in the spirit of its time,—yet there is no feeling of conscious stylization. The sense of the beholder is the same he experiences in visiting an actually old and architecturally fine house,—a sense that nothing could have been done otherwise, and that nothing that could be done would add any charm or any manner. More likely it would destroy rather than improve. There is more in architecture than form. More, even, than manner and technique, which may have to do with modifying form, with giving form different inflections, different gradations of meaning. Architecture, thus refined, thus drawn away from material values, begins to express values psychological. This house, for instance, gives the impression of a place of old and known abode, a place created by and a part of gentlefolk who lived here, who entertained here in a more leisurely age. Here are rest, and surcease from whatever phases of the immediate age we may find uncongenial; here is room for old ideals of graciousness and courtesy; for a kind of life that is both formal and informal,—and quietly well bred in all its expressions and all its implications.

Refinement of detail and beauty of woodwork are evidenced quite as much in this splendid example of early American Colonial architecture as is found in the more stately and pretentious examples of the later development of this style in Virginia and the Carolinas. The use of many carefully selected and harmonious colors in the painting and furnishings of the various rooms also adds to the individual charm and character of this house. Unfortunately, the many illustrations which accompany this brief description fail entirely in giving any adequate idea of the depth and harmony of the colors used. The many different types of fireplace designs, the well proportioned small-paned windows and the comparatively low ceilings of all the rooms add to the atmosphere and appearance of genuine antiquity, which this house possesses to an unusual degree. The plan is interesting in its arrangement, rambling over a great many square feet of property. Although all of the important rooms are of substantial size, there are many delightful small rooms for cards, writing, reading and quiet conversation. The owner is indeed fortunate to have secured the services of architects so sympathetic and so successful in the creation of one of the most individual, consistent and interesting country houses ever built in this country.

South Wing

House of William McCormick Blair, Esq., Lake Forest, Ill.

David Adler and Robert Work, Architects

DETAIL OF THE EAST FRONT
HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS

Plans on Back

GARDEN ENTRANCE

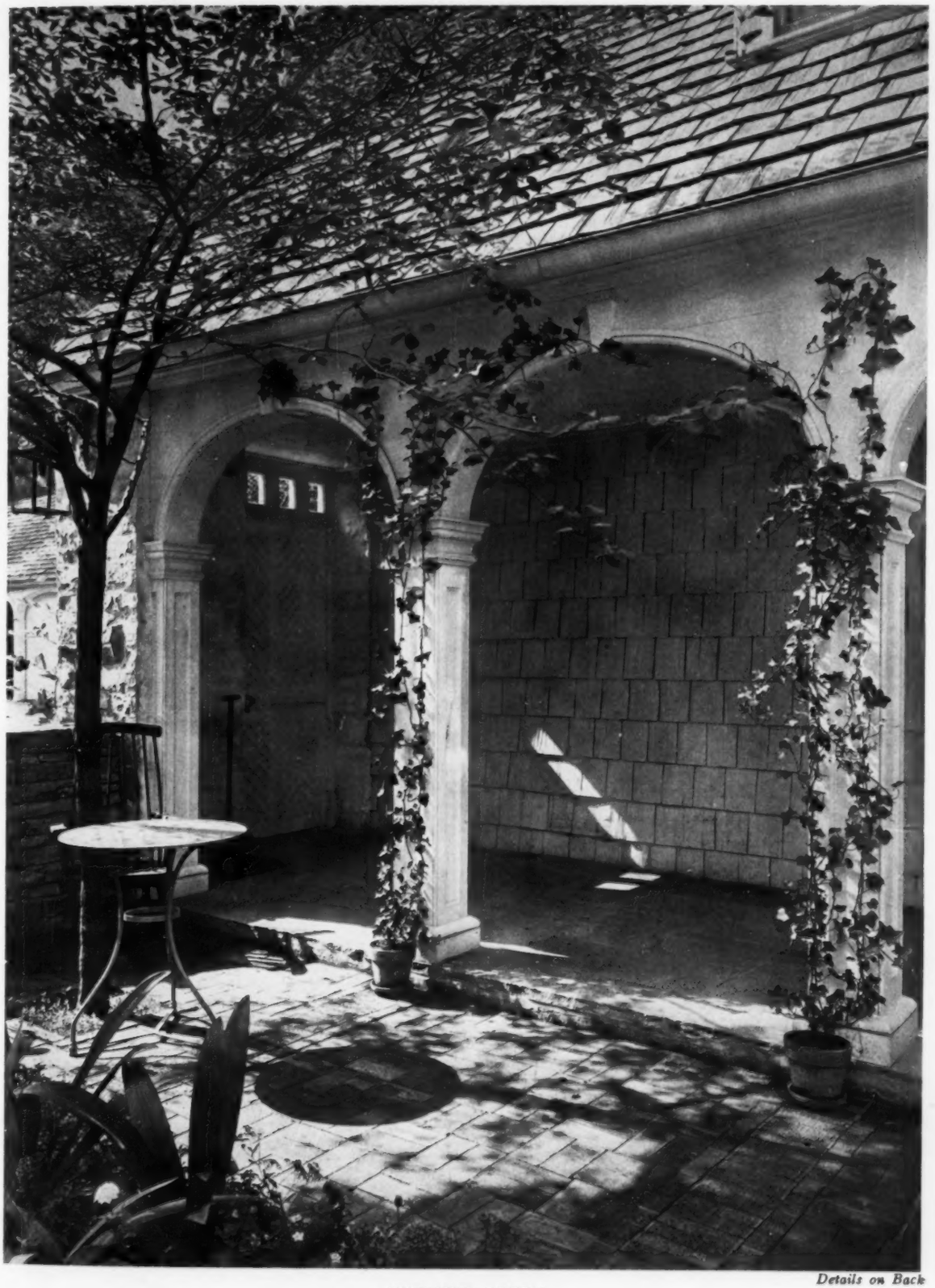
HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS

SECOND FLOOR

FIRST FLOOR

PLANS: HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS

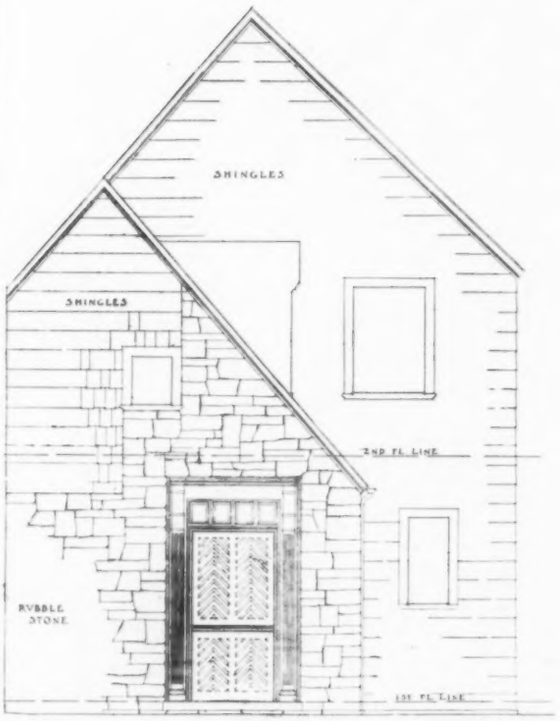


Details on Back

ENTRANCE LOGGIA

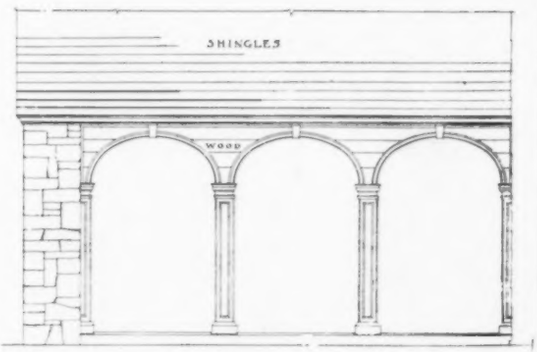
HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS



WEST ELEVATION

MAIN ENTRANCE PORCH



SOUTH ELEVATION

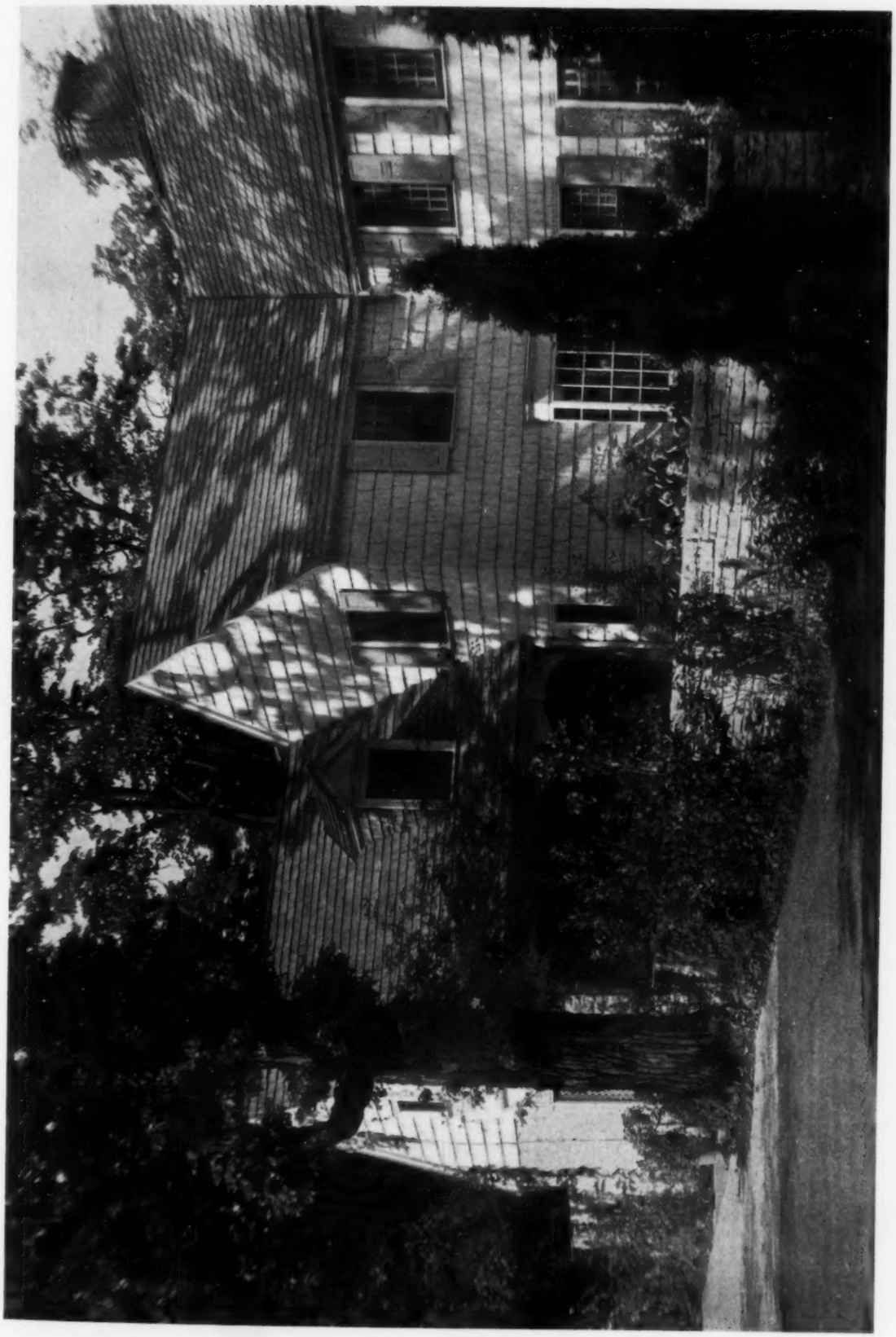
DAVID ADLER AND ROBERT WORK, ARCHITECTS

DETAILS, HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

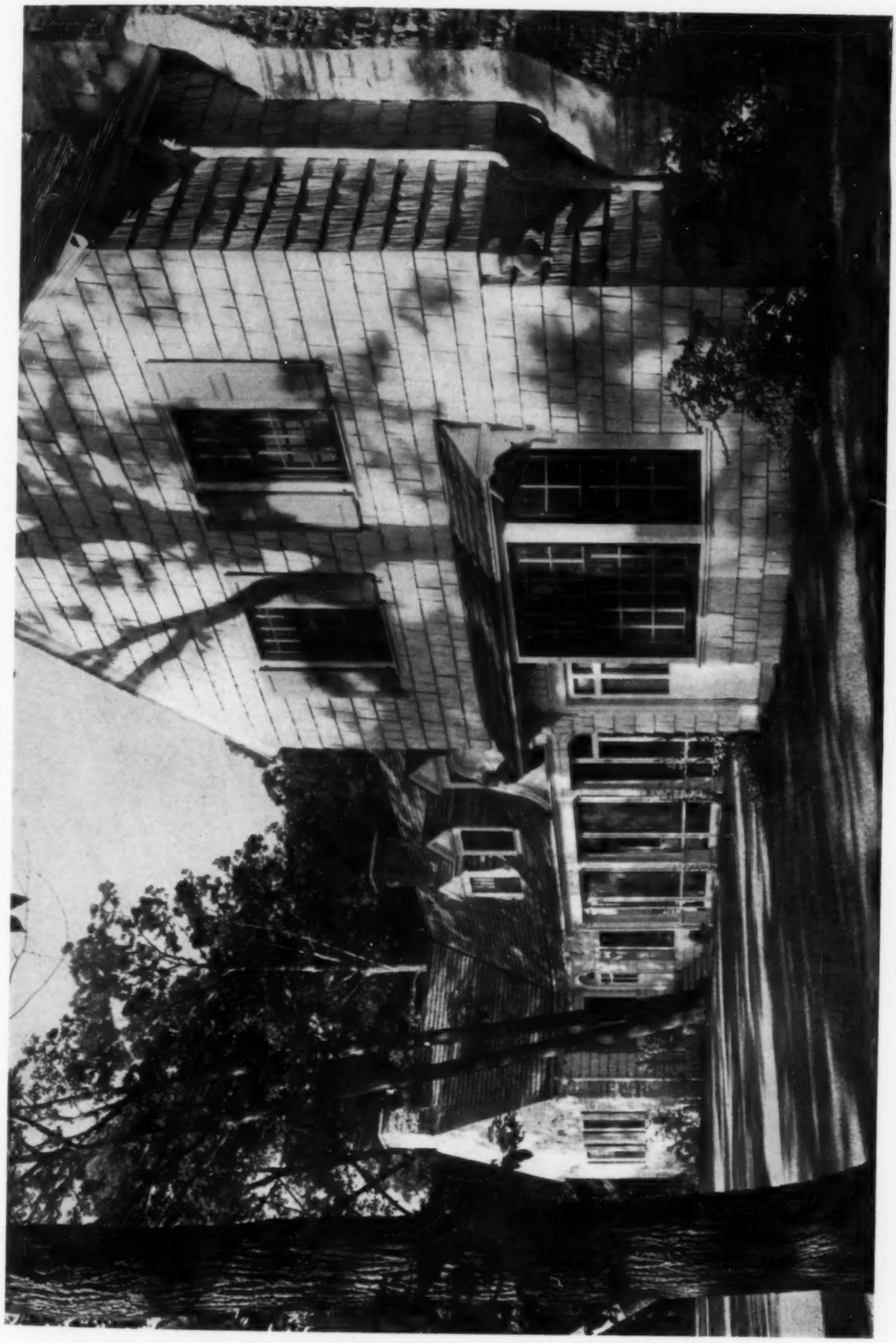
JAN. 1929

No. 2

The ARCHITECTURAL FORUM DETAILS



ENTRANCE FRONT
HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS

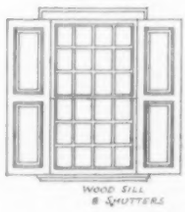


Details on Back

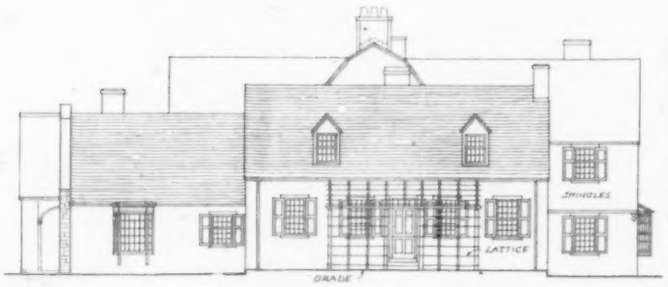
EAST FRONT
HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS

EAST ELEVATION

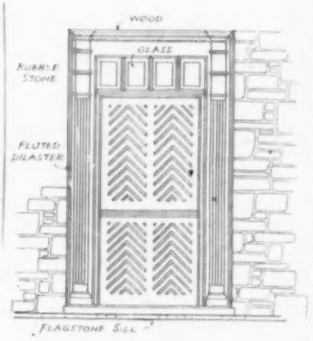
WEST ELEVATION



SHUTTER DETAIL



SOUTH ELEVATION



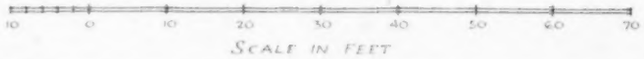
DETAIL of FRONT ENTRANCE

NORTH ELEVATION

DETAILS of COUNTRY HOUSE for WILLIAM Mc CORMICK BLAIR.

DAVID ADLER AND ROBERT WORK ARCHTS

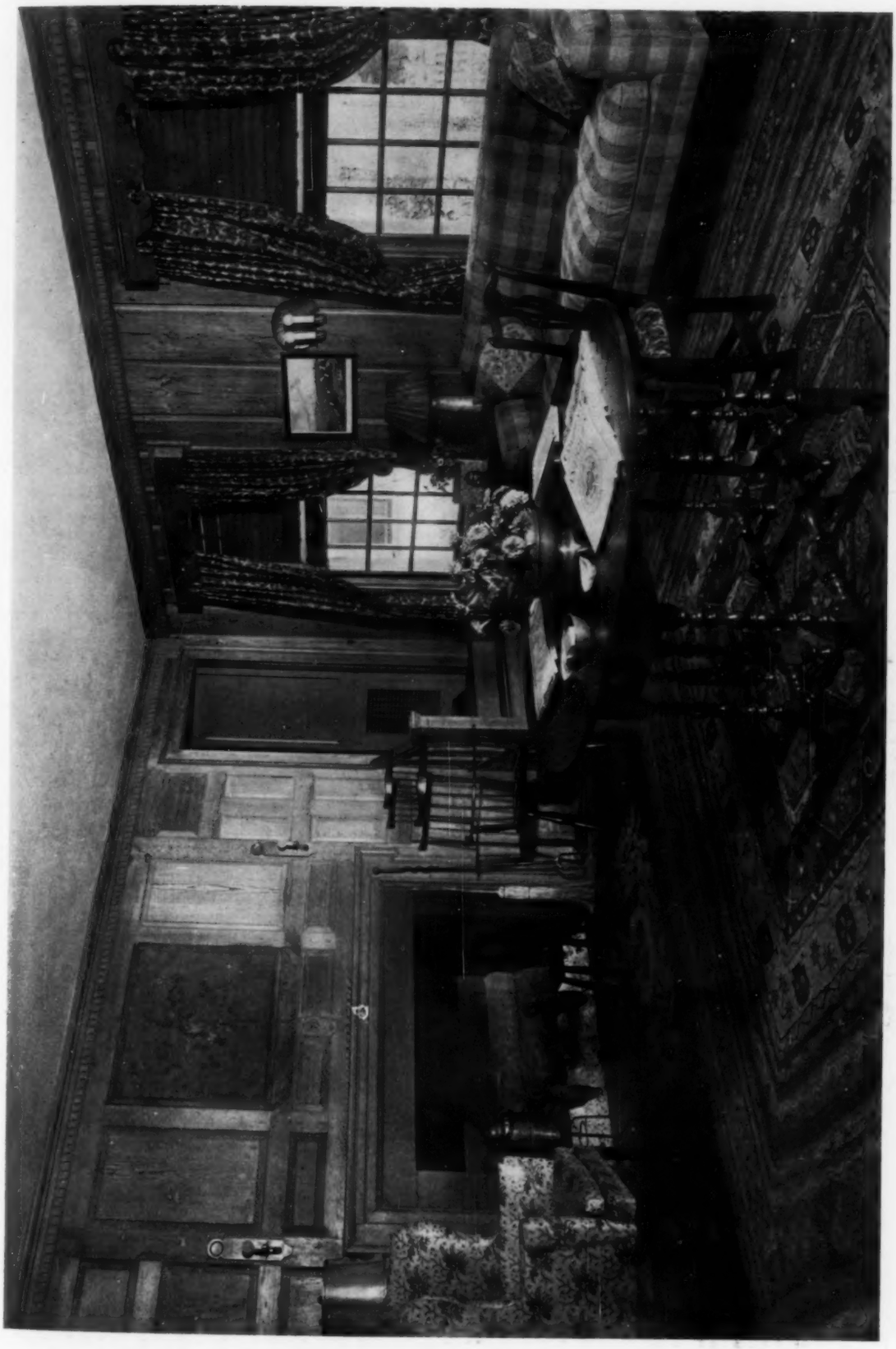
JAN 1929



SCALE IN FEET

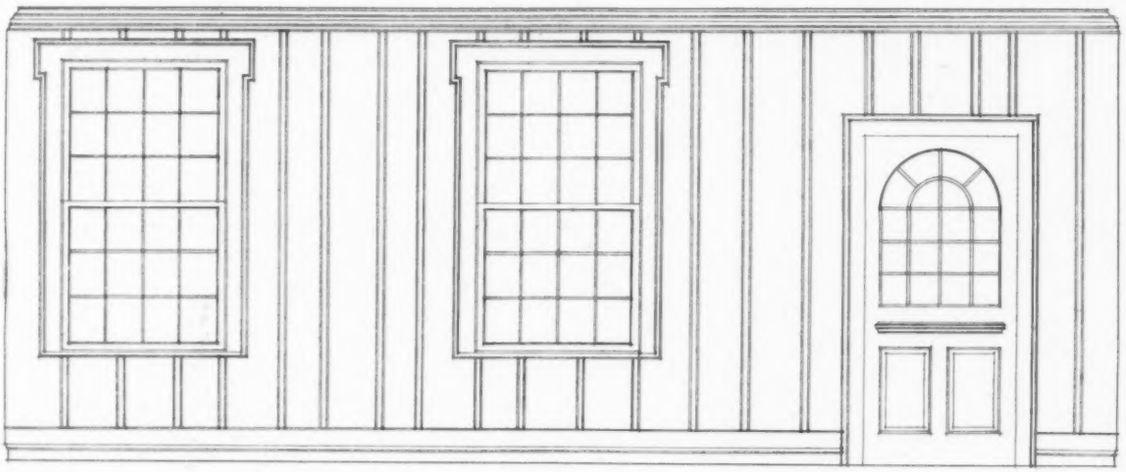
No. 3

The ARCHITECTURAL FORUM DETAILS



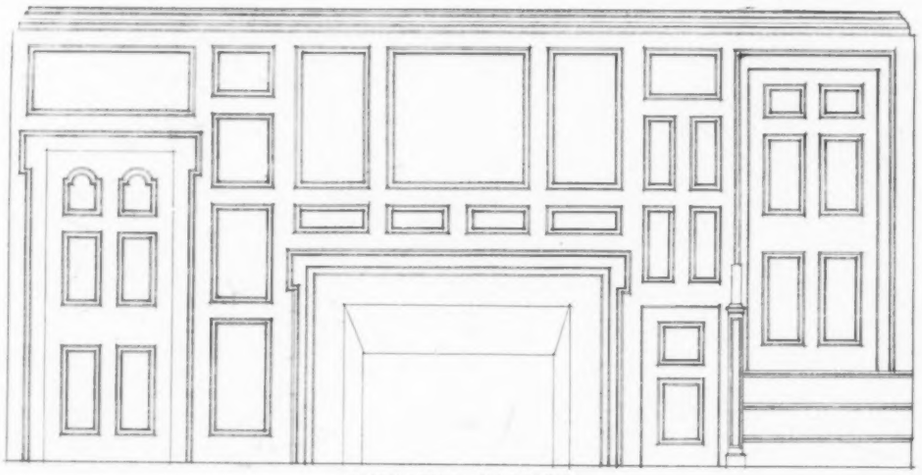
Detail on Back

SITTING ROOM
HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS

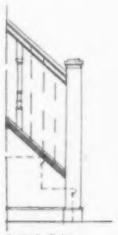


WEST WALL

SCALE 0 1 2 3 FT



SOUTH WALL



STAIR

SITTING ROOM

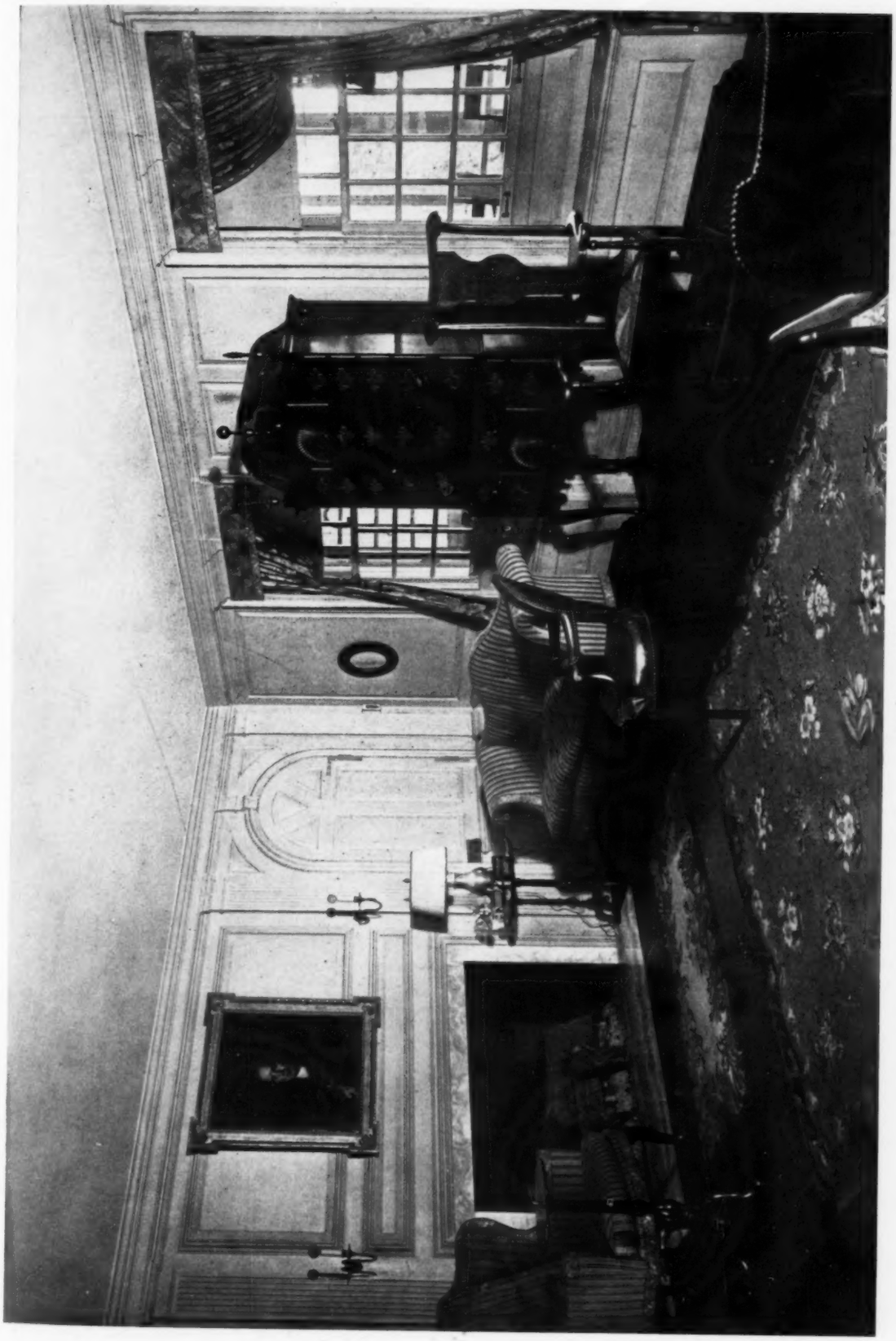
HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS

JAN. 1929

No. 4

The ARCHITECTURAL FORUM DETAILS



LIVING ROOM
HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS

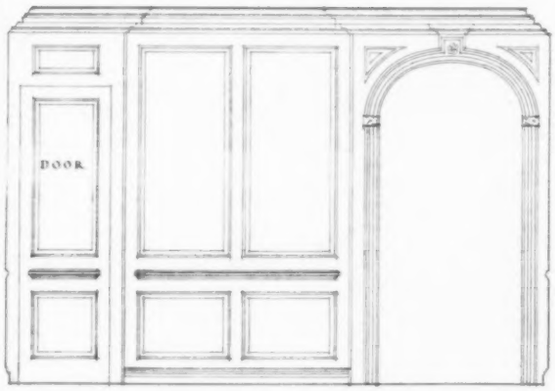
DINING ROOM
HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS

Details on Back

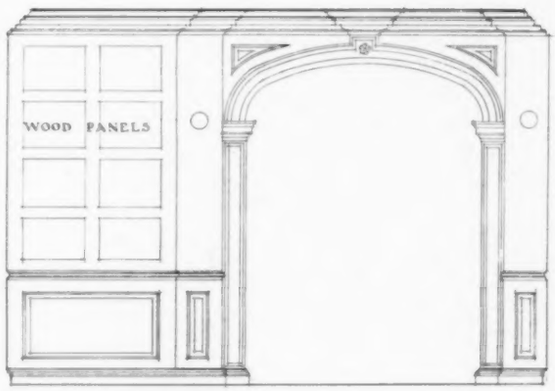
ENTRANCE HALL

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS



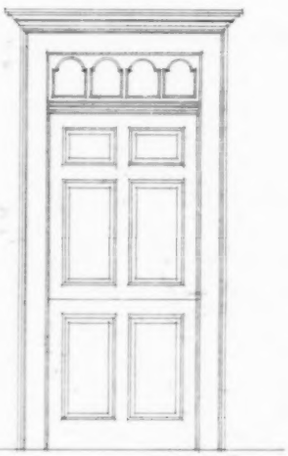
WEST WALL



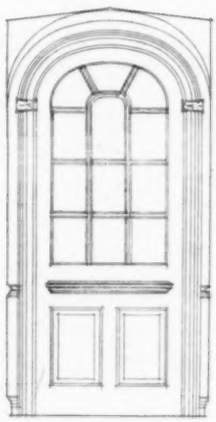
EAST WALL

ENTRANCE HALL

SCALE
0 1 2 3 4 FT



AN EXTERIOR DOOR



VESTIBULE DOOR

SCALE
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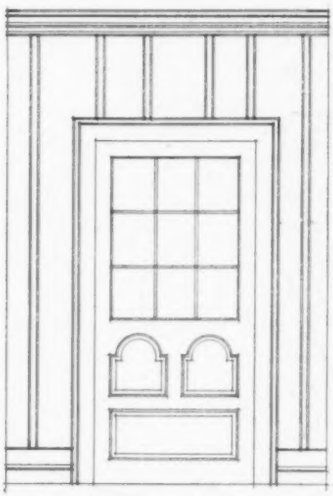


SITTING ROOM DOOR

DETAILS, HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS

JAN. 1929

No. 5

The Architectural Forum Details

ENTRANCE HALL

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS

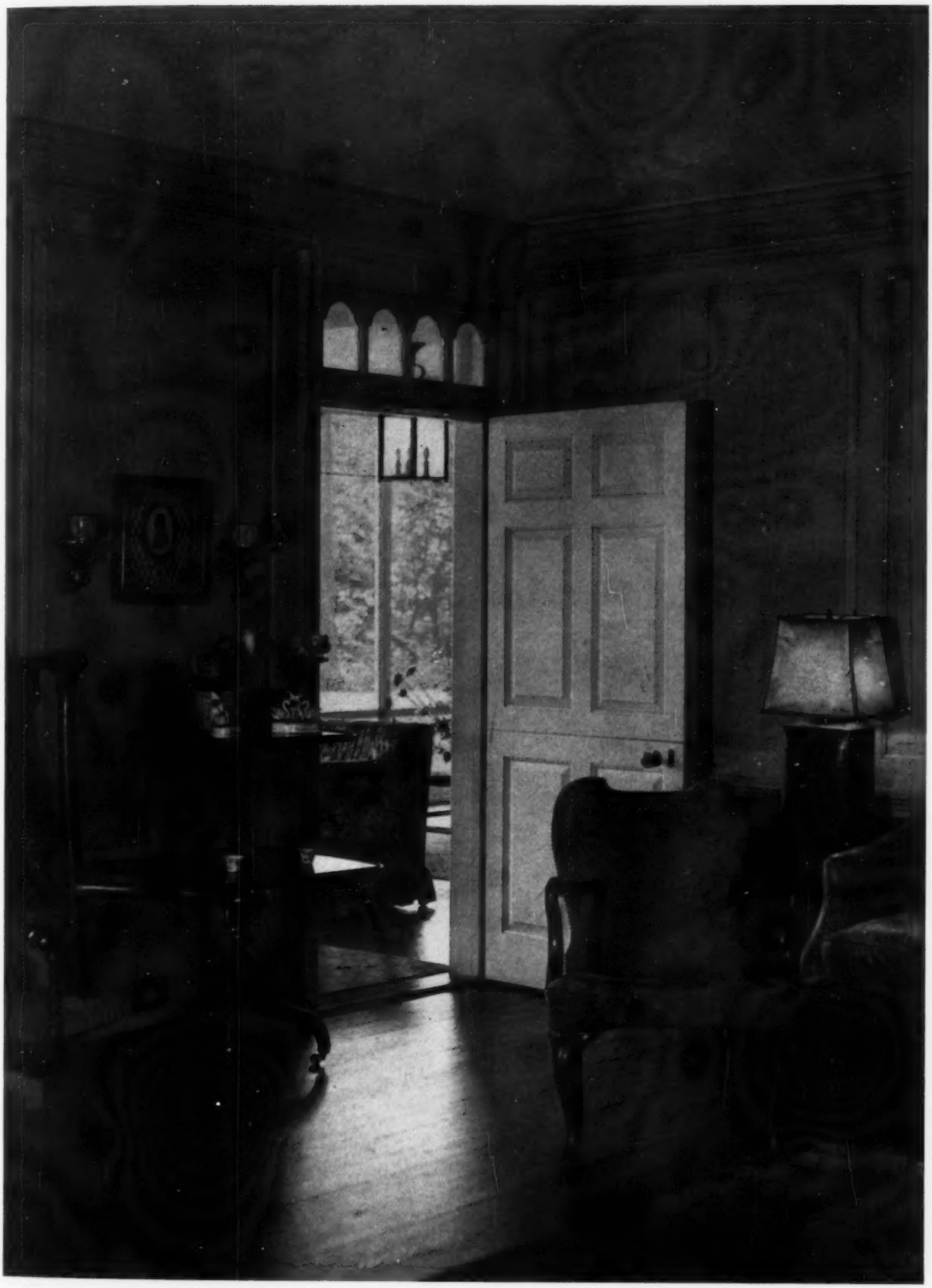
WINDOW IN ENTRANCE HALL

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS

CORNER IN SITTING ROOM

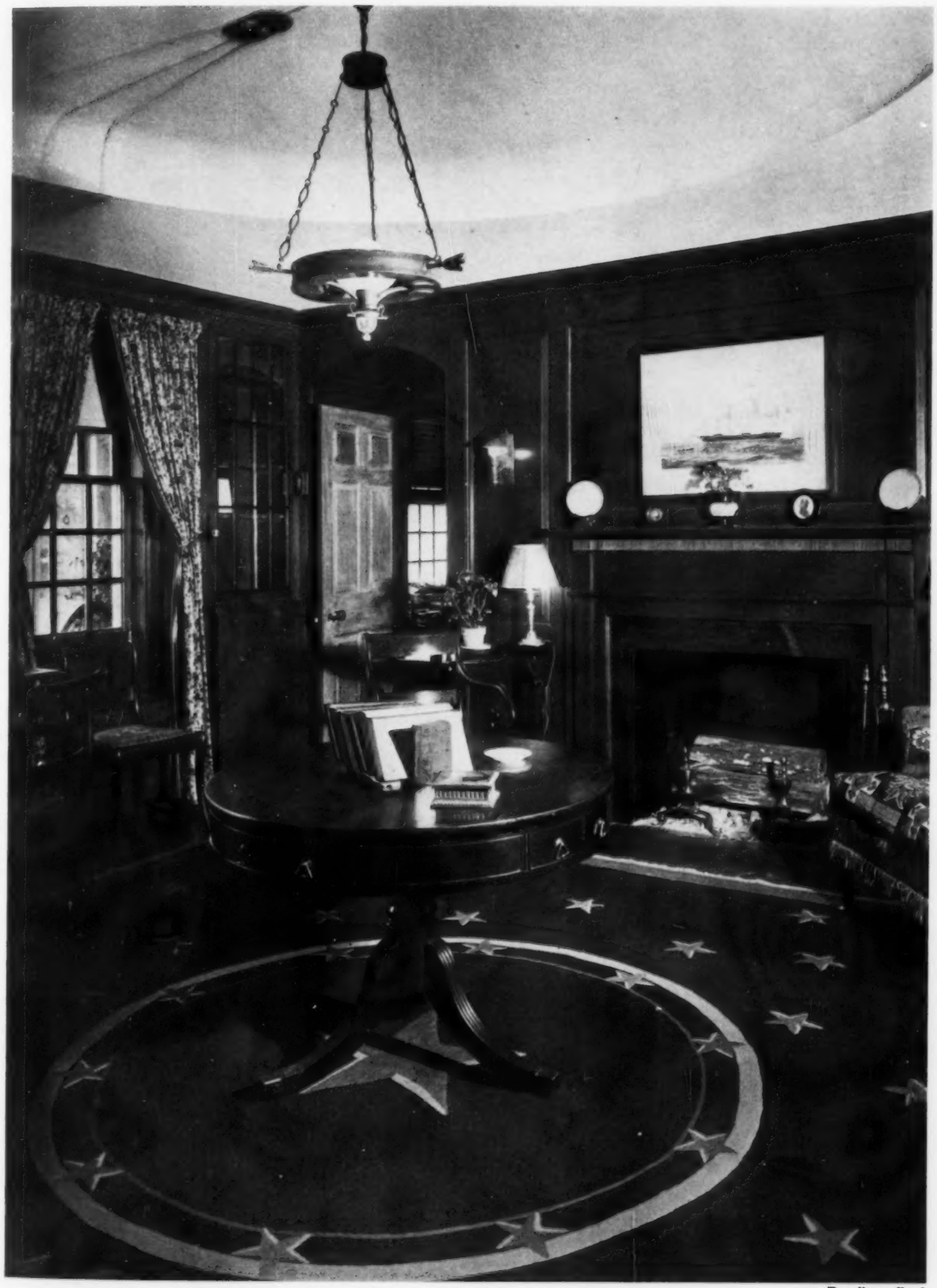
HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS



CORNER IN LIVING ROOM

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

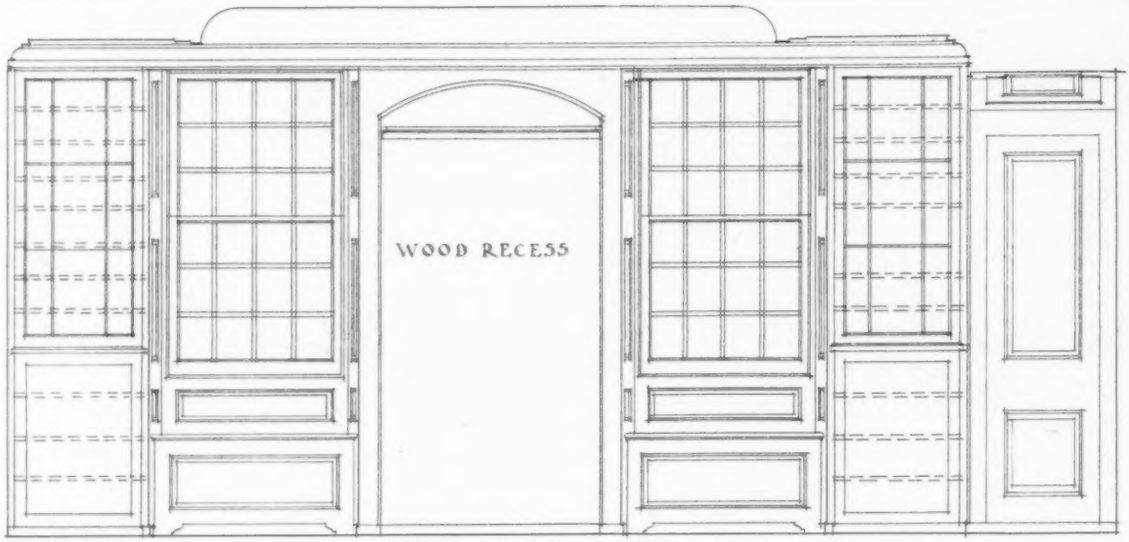
DAVID ADLER AND ROBERT WORK, ARCHITECTS



Detail on Back

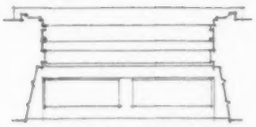
LIBRARY

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS

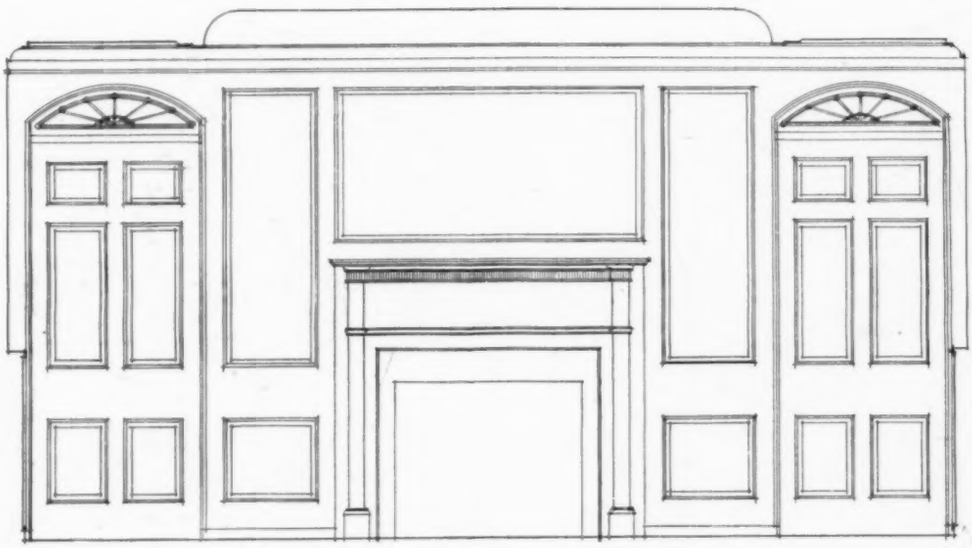


EAST WALL

SOFFIT



RADIATOR POCKET



SOUTH WALL

SCALE 0 1 2 3 FT.

LIBRARY

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS

JAN. 1929

No. 6

GUEST ROOM

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS

MASTER BEDROOM

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS

BACHELOR'S BEDROOM

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS

THE REJUVENESCENCE OF WROUGHT IRON

BY

W. FRANCKLYN PARIS

THE many who have raised amused eyebrows over the bizarre effects created by some of the modernists in their excess of innovating zeal, may take heart and be comforted if they will turn their critical gaze upon the artistic wonders now being worked in iron by the French *ferronniers.* Thanks to new facilities in the working of the metal, the use of the lathe and the acetylene torch, iron has become as ductile as clay, and it is now possible to speak of steel "modeling" without taxing the credulity of the uninitiated who do not realize as yet the ductility of the most obdurate metals when brought under subjection in the modern forge by oxygen blowpipes. In the old days the smith had to be "a mighty man." The hammer and the anvil and his own brawn were the instruments which permitted him, in due time, to fashion a church grille or a suit of armor. That he succeeded in bringing out such wonders as the *rejas* of a score of cathedrals,—Burges, Toledo, Granada,—or masterpieces such as the damascened armor of Charles V or Francis I with such primitive tools and at the cost of so much physical effort, is little short of marvelous.

For four centuries, in spite of many improvements in technique, we were unable to surpass or even to equal the work of the armorers of the fifteenth and sixteenth centuries. To view the casques, cuirasses, *chanfreins,* the embossed and fluted armor for man and horse, preserved in the *Armeria Real,* of Madrid, the Museum of Artillery of Paris, or our own Metropolitan Museum, is to be made very humble. That men with their bare hands and such primitive tools as hammer and tongs, pincers and files, saws and vises could have wrought so much beauty out of such recalcitrant materials as iron and steel, leaves the thoughtful breathless with admiration. The same humility will be engendered at sight of the wonderful tracery in iron in the grilles that surround the main altars of the cathedrals of the sixteenth century and which are designated by the Spanish word *rejas.* These *rejas* give evidence of immense labor, extraordinary skill and high artistic sense. In those days, art was long. Without going into the causes of the eclipse suffered in the metallic arts since then, let us rejoice that the darkness is ended and that lasting beauty is again being created in the material once refractory, but now rendered workable by modern science.

From the fourteenth to the seventeenth century, wrought iron played an important role in interior and even exterior decoration. Grilles, balconies, stair rails, lanterns, candelabra, locks, gates, screens, expressed the skill and taste of the metal workers of those days. Even in the eighteenth

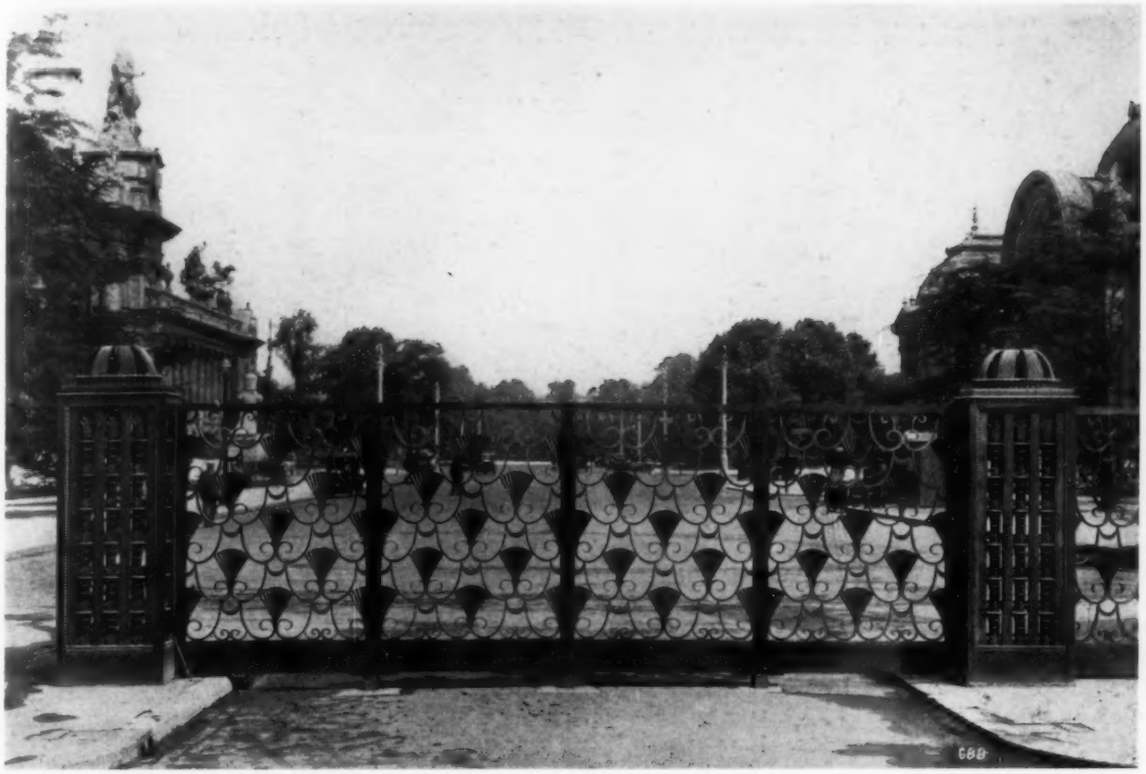
Gate, "Les Cigognes," by Edgar Brandt

Gate by Edgar Brandt

Grille, "Golden Age," Executed by Edgar Brandt from Designs by Favier, Architect, and Blondat, Sculptor

century we have such examples as the gates fashioned by Jean Lamour for the miniature Versailles erected in Nancy by the ex-king of Poland, Stanislas Leczinski, to show that the art was not a lost art, but with the coming of cast iron the *ferronniers* lost their individuality, and original expression ceased, to be replaced by slavish copies of Louis XV or Louis XVI models. The first symptom of a revival dates back to the magnificent rail fashioned for the Chateau of Chantilly by the brothers Moreau, in 1880. Subsequently, isolated amateurs commissioned their architects to introduce wrought iron ornamentation in the designs of their homes, and when the *art nouveau* craze became epidemic, in the decade from 1895 to 1905, the French *ferronniers* once more let loose their imagination and all sorts of botanical effects were created with tortured iron. Standing apart from these innovators, all occupied with the stylization of vegetal growth, was a clear-seeing artist who refused to follow the exaggerations of the hour and who designed and wrought sober works adapted to their intended use and yet inspired with the prevailing taste for floral forms. The eccentricities of the *art nouveau* period have died the death which they deserved, but the metal works of Emile Robert still live.

The present golden era in the art of metal working in France can be traced to the influence exerted even then by Emile Robert. The men who are now turning out the simplified and harmonious pieces so deservedly admired are pupils of Robert or are artists who have followed the trail blazed by him. It was Robert who first showed that wrought iron decoration was possible without constant recourse to use of the acanthus leaf, and while he came too early to be identified with the present *art moderne* formula, his work has in it the elements of logic and clarity and modernism that characterize the decorative art of the moment. 'We are living in a machine age, an age of metal, the steel age, the age of iron, the age of speed. The aeroplane, the radio are expressions of a state of mind, or rather they have created a mental attitude that is different from the mental attitude of the dainty marquises of the time of Louis XV. Then was leisure; the *tempo* of life was that of the minuet. Today it is that of jazz! The art of today is more virile than the art of yesterday, and metal is taking the place of upholstery. Under this stimulus, consoles and door imposts are being fashioned of metal instead of wood and painted canvas; lighting fixtures, table supports, all sorts of screens, cornices and borders, mouldings and frames are of polished iron or steel or oxidized metal. Only yesterday these works of art in metal were sought only by the aristocracy, and each piece was unique and individual. The demand was slight and the supply in proportion, but today the *profanum vulgus* has



Gate of Honor, Arts Decoratifs Exposition, Paris, by Edgar Brandt

had its taste raised by the wide diffusion of photographic reproductions of works of art, and to meet the demand, artists in metal have had to become manufacturers. Popular taste has improved.

Only by converting his studio into a factory could Robert have turned out the hundred grilles, balconies, railings, screens, chandeliers that decorate the Cartusian Cemetery in Bordeaux, the Museum of Decorative Arts in Paris, the French Consulate in Brussels, the Lutetia Hotel and a score of private homes and public buildings. His successors in popular favor,—Edgar Brandt, G. Szabo, Raymond Subes,—conduct large metallurgic plants to execute their designs, and thus the output is rapid and voluminous. The work of these *ferronniers* really dates back only a few years, since all their efforts were necessarily interrupted by the four paralyzing years of the war. With Ruhlmann, Dufrêne, Sue and Mare and Paul Follot, they represent the rational element of the *art moderne* school. The axiom that an object must be perfectly adapted to its function dictates their designs. They believe that a thing is beautiful when it fulfills exactly the purpose for which it was created. Form is everything; its ornament comes after, and even then it must not be unnecessarily applied. They have avoided the flagitious geometrical eccentricities of the radicals and they admit the curved line into their designs. They all have in varying degree an intuition of beauty. Good taste is instinctive with the French, just as it was with the ancient Greeks and the Japanese, but under the rallying cry of "Novelty, novelty at all costs," which brought together at the Expositon of Decorative Arts of 1925 every variety of the bizarre, they attempted the impossible and tried to create forms and ornamentation completely divorced from what had gone before. Brandt, Szabo, Subes, the brothers Nics, Paul Kiss, Schenck,—all show inventive genius and originality. They are modernists and scorn to copy the old *cliches,* but their composition is sane and plausible and not the product of a geometrical delirium, which the work of some seems to be.

There is to be noted, when we analyze the creations of a *ferronnier,* that in addition to his artistic ability he must possess technical and scientific knowledge not needed by the artist who is merely a draftsman. It is not enough to create a design; if it is to find expression in iron, the design must be of a nature that will lend itself to metallic realization. A good *ferronnier* is in addition a good architect, a good engineer and a good chemist. Sometimes this ideal may not be attained, in which case the *ferronnier* must enlist the coöperation of an architect. We find Brandt, for instance, collaborating with the architect Favier and the sculptor Blondat in a magnificent grille in which are set modeled figures in gilded metal.

Iron having become as malleable as putty, and

WROUGHT IRON GATES BY EDGAR BRANDT
FOR THE ARTS DECORATIFS EXPOSITION, PARIS

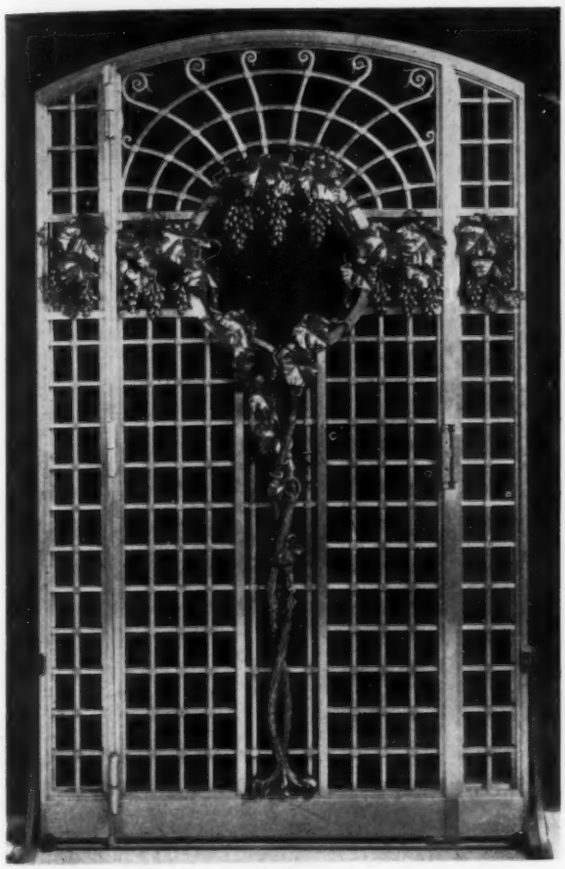
ENTRANCE DOORS TO A PRIVATE RESIDENCE, PARIS
DESIGNED AND WROUGHT BY EDGAR BRANDT

Stair Rail in the Residence of Paul Poiret, Paris
Designed and Wrought by Edgar Brandt

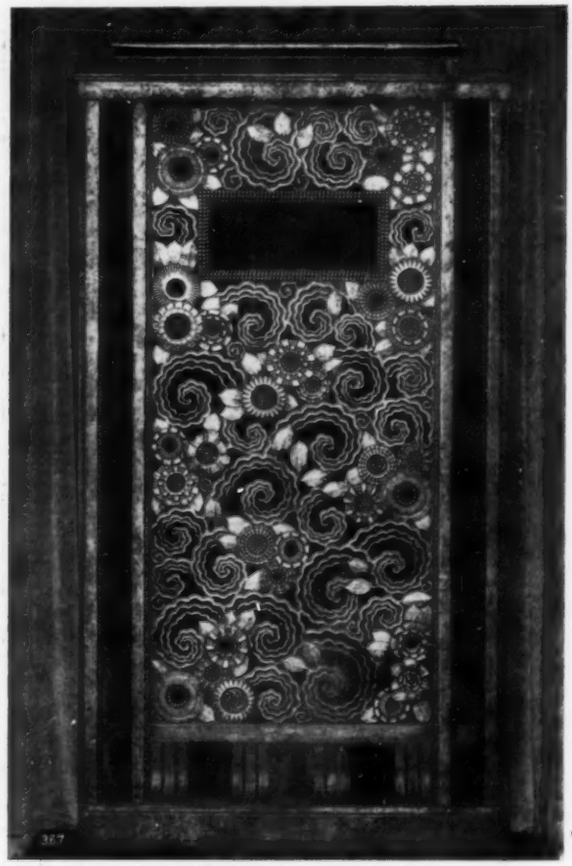
Stair Rail, S. S. Paris, French Line
R. Bourvens de Boijen, Architect

the new technique, aided by electrical machine-tools and the acetylene torch having facilitated the thinning and welding of the metal, we find ourselves beholding fine traceries impossible of execution under the conditions existing a generation ago. Similarly we find the *ferronniers* widening their field in the designing of their pieces, so that instead of inspiring themselves with the works of the earlier workers in metal and copying or executing variations on their themes, they now inspire themselves from textile designs found in old silks from China and Japan, wall decorations found in Egyptian tombs, or motifs borrowed from Aztec or East Indian sculpture. The field opened up by the new technique is so vast that it can be said to be limitless. Difficulties no longer exist, and we may even find in the near future some master in the new art reproducing in iron some cobweb design executed in Malines lace. Brandt utilizes the plant life in many of his designs, but he seeks exotic examples, such as the *ginko-biloba* which grows in Indo-China, and other tropical vegetation. He also uses to advantage the interlocking of circles and circular flowers and the strange outlines obtained by cross-sectioning the stems of certain plants. When he composes a grille, his first concern is its general architecture, the proportions, the divisions, the relation of height to width, etc. He then fills his vertical panels, but the decoration never extends beyond the frame. There is a surface, and nothing protrudes therefrom. No plant, if plant motifs are used, projects a leaf or thorn or twig beyond the thickness of the framework. All large fruits or flowers are banished, because their rotundity would be out of scale and destroy the unity of the dimension of thickness. During the "naturalist" period, the stunt was to reproduce plant life in its most minute detail, with the result that the *ferronnerie* of the period was dangerous of approach, with all its sharp points and edges.

The rationalism of Brandt, his acknowledgment of the past as a valuable inheritance, his strength and at the same time his lightness and gracefulness of touch, his originality and modernism and at the same time his respect for tradition, make of him the acknowledged master of the rejuvenated art of metal working. His contrasts are obtained by oxides and the use of silver and gold, which emanates from the metallic harmonies composed



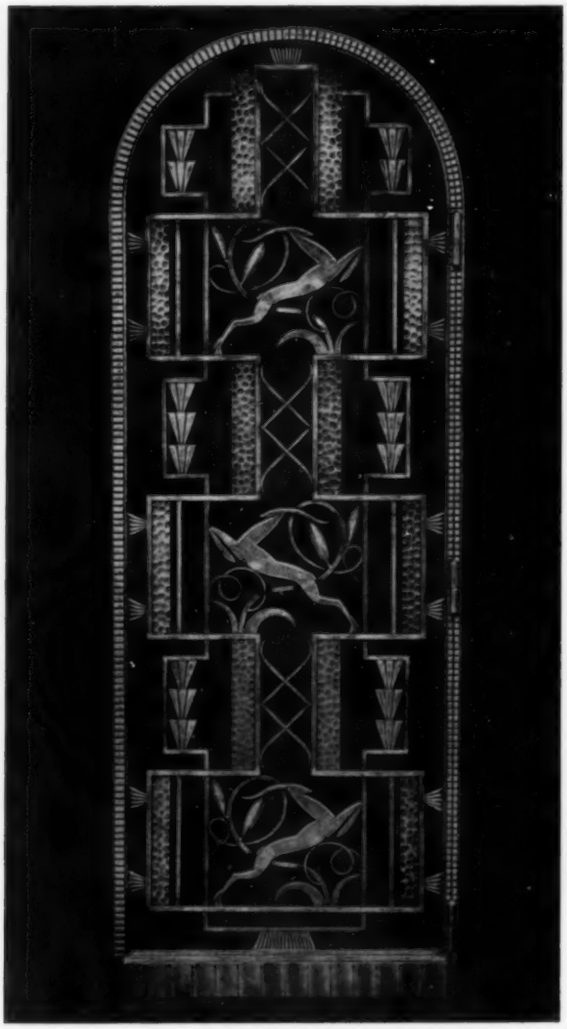
Entrance Door to a Private House by Edgar Brandt



Wrought Iron Screen by Edgar Brandt

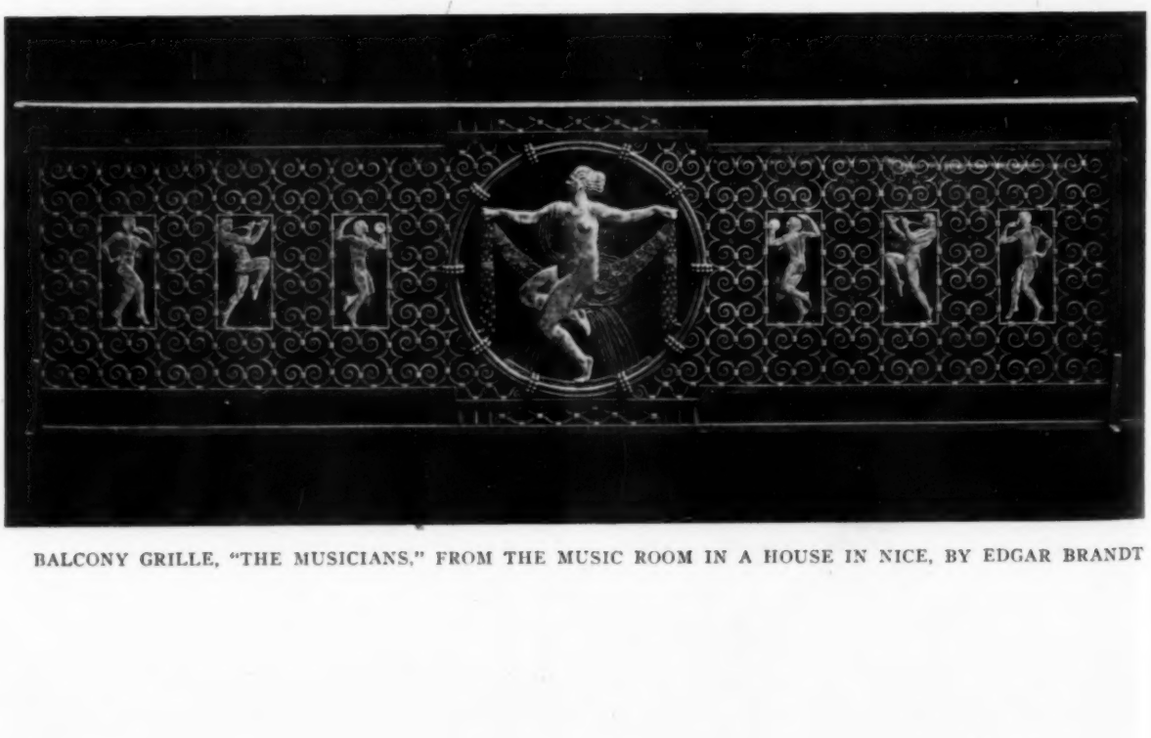
by this musician-mechanic. The public has seen his setting for the "eternal flame" at the tomb of the unknown soldier under the *Arc de Triomphe;* the monument in commemoration of the armistice at Rethondes; the gate to the monument at Douaumont; and the grille at the entrance to the Exposition of Decorative Arts, and hundreds of private residences, not only in France but in every capital of the civilized world, hold gems of his making that photography can only feebly portray. The illustrations that accompany this article will give a graphic idea of the fertility of invention, the mastery of the new technique, the harmony of ensemble and detail and the architectural unity of the works of this great artist, but they cannot convey the feeling created by the tone, the color, the patina. Note the delicacy of tracery, without sacrificing solidity, in the grille for the Exposition of Decoratve Arts. A simple assemblage of alveolar, fan-shaped segments, is united in a sort of damask pattern by fine arabesque curves. Observe the sinuosity, the movement, in the stair rail for the liner "Paris." A more fanciful note is struck in the door where the panels are balanced by a conventional antelope against a background of vegetal spirals (page 96).

A realization of the gain to art resulting from the new technique of welding will be derived from the study of this delicate interior gate in which the ligations are all obtained by welding and in which solidity is obtained without the use of vertical or horizontal bars that would have been needed for support if the design had been realized with the old tools and according to the old technique. These ribbon-like rushes that curl with such spontaneity in the six repeated panels would lose all their gracefulness if we had to view them against a background of supporting uprights. Here we have lightness and daintiness without sacrificing solidity. The gate remains a separation,—a boundary marker—but does not become a mask or a wall shutting off or obscuring the view of what lies beyond. When a grille is intended as a screen, Brandt crowds his ornament together until the entire surface appears covered, as in the remarkable door, *"L'Age d'Or,"* in which botanical circles are used to form a pattern. This is the door in which are incorporated three sculptured groups in modeled copper, the work of the sculptor Max Blondat, set in octagonal panels.



HINGED DOOR GRILLE BY EDGAR BRANDT

GRILLE DOORS BY EDGAR BRANDT



BALCONY GRILLE, "THE MUSICIANS," FROM THE MUSIC ROOM IN A HOUSE IN NICE, BY EDGAR BRANDT

COPYING *VERSUS* CREATING

BY

SHEPARD VOGELGESANG

AS a statement of the point of view of conservative designers, this is perhaps a fair example: Contemporary life moves so rapidly and is subject to such varied influences that the creation of a form vocabulary constituting a style is a practical impossibility. Hence it follows that a rushed age should accept the forms created by periods with more leisure for beauty. The architect is presumably an individual sensitive to beauty, so an architect is selected to supply the æsthetic vibration to the past which his client has not himself had sufficient opportunity of acquiring.

There is no denying the acceleration of present-day life, nor can anyone,—least of all an American,—deny the multiplicity of influences brought each day from world-wide sources and complicated by a highly technical existence. That an ordered expression of this complex existence and this embarrassment of influences can be attained by choosing beauty from the past, almost refutes itself. The full appreciation of beauty makes such varied demands on the intelligence and emotions and is such an individual and period matter that a permanent majority in the electorate, —or indeed any majority at all,—is itself impossible. Where today are the enraptured admirers of Carlo Dolce and Guido Reni? Yet in the Victorian age they occupied the place that Giotto and the so-called primitive dominate today.

The establishment of the architect as arbiter of the æsthetic past is a clear acknowledgment of his theoretical position in this country. Though such may be his theoretical position, it has all the cold comfort of too perfect a theory. Practically, his authority is tempered by suspicion. A mute, carte blanche client is a rarity. This condition of affairs leaves both architect and client in the possession of merely a pleasant mutual delusion. With other professions which do not deal in the intangible media of taste and historic association, the client surrenders his judgment more completely to the recognized technician. The evidences of his own lack of training are too visible, and their consequence too likely to result in palpable disaster!

In the past generation McKim, Mead & White and others, through often grandly conceived and superbly executed work, emphasized the style element in design to the American mind. The shift caused by the rise of wages and the multiplied technical and luxury demands on incomes changed the condition of architecture from feudal simulation to practical necessity. There arose problems of a nature that discomfited feudalism, and architects, clinging to what had been expected of them, did as best they could. The fault in the position of the architect lies largely in his decay as a technician. It is easier to relate this than to define the meaning of "technician." An architect is technically trained to the convenient ordering of the spaces of a building, and he is acquainted with the best materials and means for the execution of his arrangement. Since the time of Vignola and the incorporation of detail for its historic value, a further side of his technical equipment has suffered,—namely, his complete sensitiveness to the life of his own time. Architecture from the Renaissance to almost the present generation became largely a matter of providing a flattering setting for life with an eye constantly on the past.

To surround oneself with reflected glory from the Greeks and the Cæsars, to be influenced by one's acquaintance with the cultures of Greece and the Orient, was the aim of this time; these counted for the realities which the architect was to express. The development of science and the consequent machine age, whatever their evil effects may have been, added other realities. The demands for space and for order made by the machine created a new discipline and scale never before found necessary. Science extended man's conceptions and power, and the machine produced the quantities and the materials which the new conditions demanded. Trained too long for a charmed circle, the architect held back, not sensing the change from providing for the favored few to the accommodating of the multitude. He acquainted himself reluctantly with the means of realizing the new demands of life, and persisted in designing for display rather than frankly accepting his problems and amplifying his technique for their solution. It is not style that is needed,—it is technique; it is a sense of present-day life, its acceptance and adjustment to what is fundamentally human. For this the architect needs an understanding of all styles in their human relationships; the vision to conceive the problems of the present age; the intelligence to give them an orderly and rational solution, and the imagination to use the materials afforded him with a sense of their intrinsic dignity. He needs a public imbued with the fire of beauty in original creation, people to whom life in art matters more than pedigree, and he will give his clients that subtle thing called style,—the balance between man's spiritual and physical needs,—not an arbitrary creation. When style is recognized, it is, like the canonized saint, long dead and exhaling a faint fragrance, which in the case of style is called beauty!

INTERIOR ARCHITECTURE

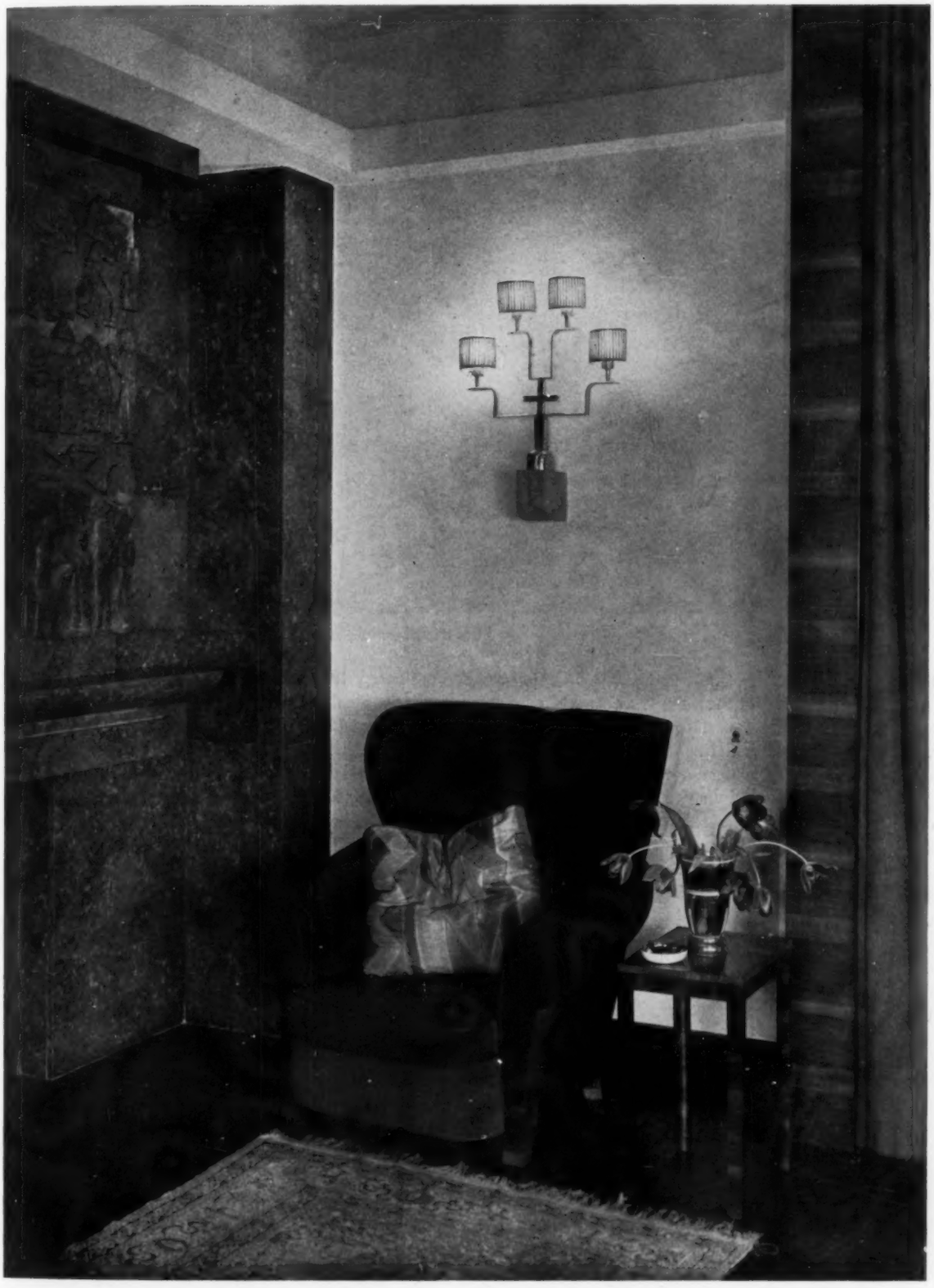
MODERN ART

BY
BRUNO PAUL

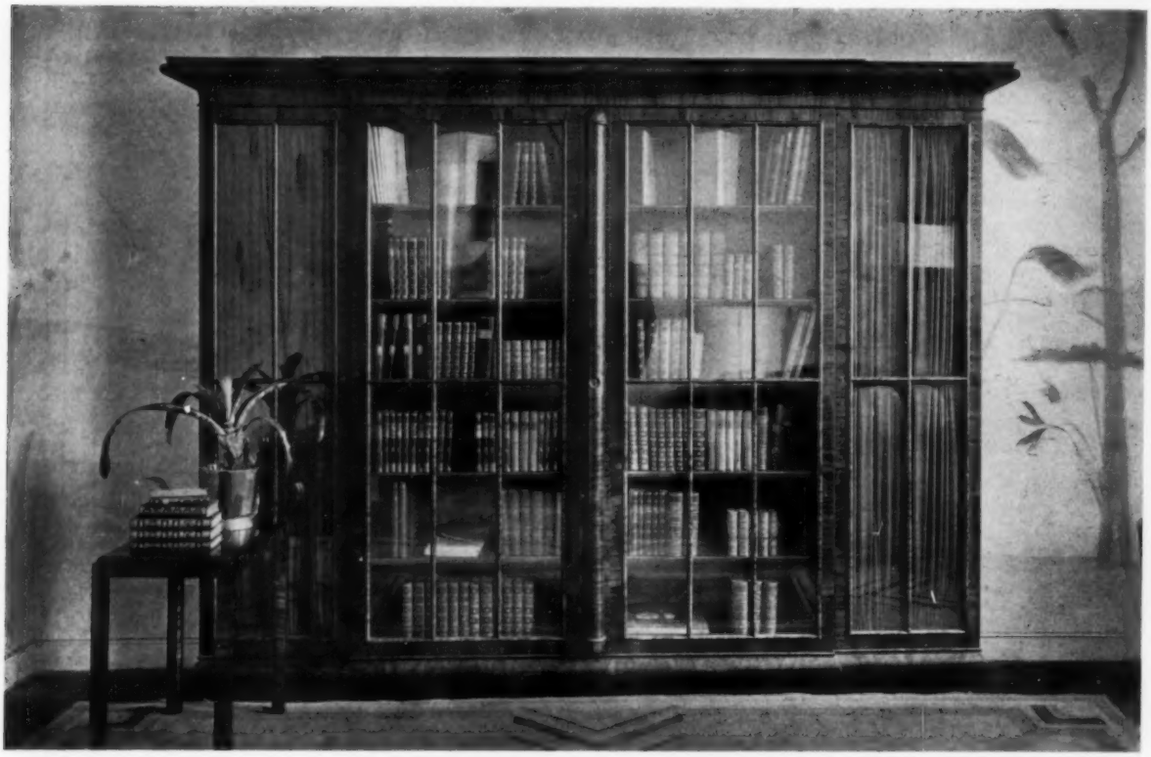
THE "modern" thought of the present times has entered upon all fields of art with a most revolutionizing effect. This influence of new thought extends to all civilized countries of the world and affects the pictorial arts, painting, architecture, sculpture, literature, and music in equal degree. New rhythms, a new pace, new harmonies, heretofore unknown, in music, color and words, all are evidences of the transformation and the change of attitude toward old established conceptions. In view of the fact that this movement has been taking place in the various fields of art during the course of the past three decades with much similarity and simultaneously, we become aware of the fact that it is more than a mere whim of the times. During the past 50 years all distances have been reduced to what would appear as a fraction of their actual extent. The radius in which the life of the individual evolves has been proportionately enlarged. Individual and universal capacity of production has been increased by the use and the improvement of machinery. Organization of traveling facilities, exchange of merchandise, circulation of money and the building up of capital have undergone fundamental changes. Public matters are dealt with more and more with thought of a social union. As a consequence, man is compelled to think and to live in a manner different from that of past years. He has shortened the darkness of the night by means of the electric light and thereby has lengthened the day; he spans distances with increasing rapidity; he has elevated production of labor by combining creative energies, and to this end he constructs for residential and commercial uses buildings which over-tower one another and which appeared to be technically impossible a quarter of a century ago. Even man himself does not

Cupboard, Stool and Rug in the Modern German Style

Marble Top Table and Lighting Fixture in the New Style



The Green Marble Mantelpiece and Black Marble Floor Contrast Harmoniously with the Deep Blue of the Chair and the Silver Walls in this Modern Interior



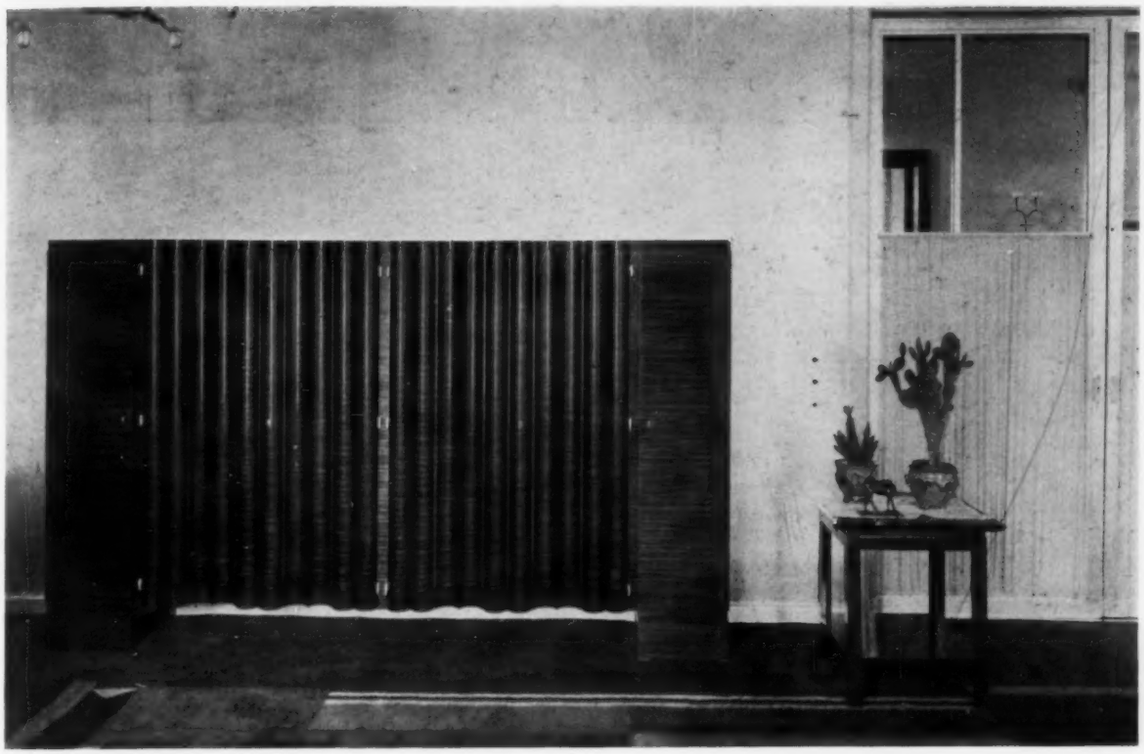
Although Modern in Feeling, a Conservative Note Controls the Design of this Enclosed Bookcase

appear the same in the twentieth century; the arrangement of his time is different, his rate of motion has changed, and also his clothing. His education at home and in school is different. He is finding new forms of expression for his inclinations. No period in the development of the civilization the human race has undergone has crowded fundamental changes into so short a time.

As a natural consequence, this period has also manifested a desire for self expression in the various fields of art. In fact, this self expression has taken form. All attempts to conceal by a historical mask the signs which are characteristic of our development are vain efforts. A convincing proof of this are the streets of New York and the Brooklyn Bridge. Let us consider the Brooklyn Bridge. No architectural structure of former times resembles that of the Brooklyn Bridge, since this type of construction, by which so large a space was spanned by a suspended steel structure resting upon masonry, is new. This has created an unprecedented type of construction. All attempts to combine the gigantic impression of the new and unprecedented with architectural styles of historical periods have only served to prove the strength of the new element.

The finishing of the interior of a building is guided by modern thought in equal degree. Leaded windows of smoked glass, not permitting daylight to enter, dark walls and faded colors on imitations of genuine materials, do not possess the beauty which may be brought into life by employing the new technical possibilities. Bright daylight entering through crystal window panes, light colored walls, furniture coverings and rugs should be created to frame the modern mode of life, the beauty of woman and the attractiveness of her clothing. This new, unexplored trend is far closer to the natural emotions and inclinations of unrestrained people than the appreciation of things the æsthetic value of which is partially obtained by the knowledge of their respective histories. Children, for instance, reach by true instinct to the new, the unprecedented. This instinct in the child runs parallel with the vigorous artistically creative imagination and the pronounced artistic expression characteristic of the drawings and paintings made by children, and we, therefore, arrive at the conclusion that love for the newly created must be an important factor of creative talent,—and that to further and develop their creative ability should always be the highest duty of the educator. They are so important that they should not be restricted by training in the acquisition of knowledge, since it is of greater importance to create than to administer and employ the already created. This touches upon the field of education in art.

The highest law is the encouragement of the pleasure derived from original creative ability. The artistically talented youth creates from his imagination things which pertain to his radius of



A Sideboard Executed in Rich Brown Tigerwood

interest. He draws flowers, people, animals or landscapes, aëroplanes, autos or railways with an unrestrained, impulsive emphasis of the outstanding feature in form and color. These are reflections of the impressions gained by the senses, which in most instances by their direct and unrestricted characteristics reach the border of the fantastic. It is most necessary to carefully guard the psychic susceptibility of youth and its ability to give to these pronounced impressions equally pronounced formulation. It is a known fact that this spring of artistically pronounced expression in most cases very suddenly ceases when the pupil is put to the task of drawing accurately from nature and to making a controllable, exact reproduction of what he is looking at. This may be explained by the fact that in the attempt to achieve perfection and to make a photographically correct reproduction, measures are set which cannot be combined with the unrestrained, fantastically inclined imagination. These critical measures are also detrimental to the naïve self-assurance and confidence of youth. It is likewise a mistake to begin an education in art by the method of copying old masterpieces. The perfect technique of form and color of the masterpieces places the ability of youth at a disadvantage, while the very value of this ability does not lie in the routine command of material and task, but in the strength of his unrestrained creation and naïve self-confidence. It is not to be understood that these two methods,—that of the exact reproduction of an object and that of the study of masterpieces of former periods,—should be omitted in the education in art. They both are and will remain important factors of education, and they become more valuable to the pupil as he advances in ability and in his appreciation of artistic values. The best principle of education for the beginner is the practical study of the material by manual work. Just as for thousands of years no education of the artist was known other than that similar to apprenticeship in the workshop of a master, in which the most beautiful pieces of art for buildings, plastic, paintings, metal art pieces, fabrics, and so on, were produced, the young artist is now placed in the workshop where the material of his profession or of his special inclination is present, and he is allowed to learn from manual labor.

The foundation of a good education lies in the realization of the fact that the imitation of genuine materials by cheap substitutes can produce only low grade results, and that only in the use of genuine materials, and in good workmanship, either by hand or by machine, can a work of art be had.

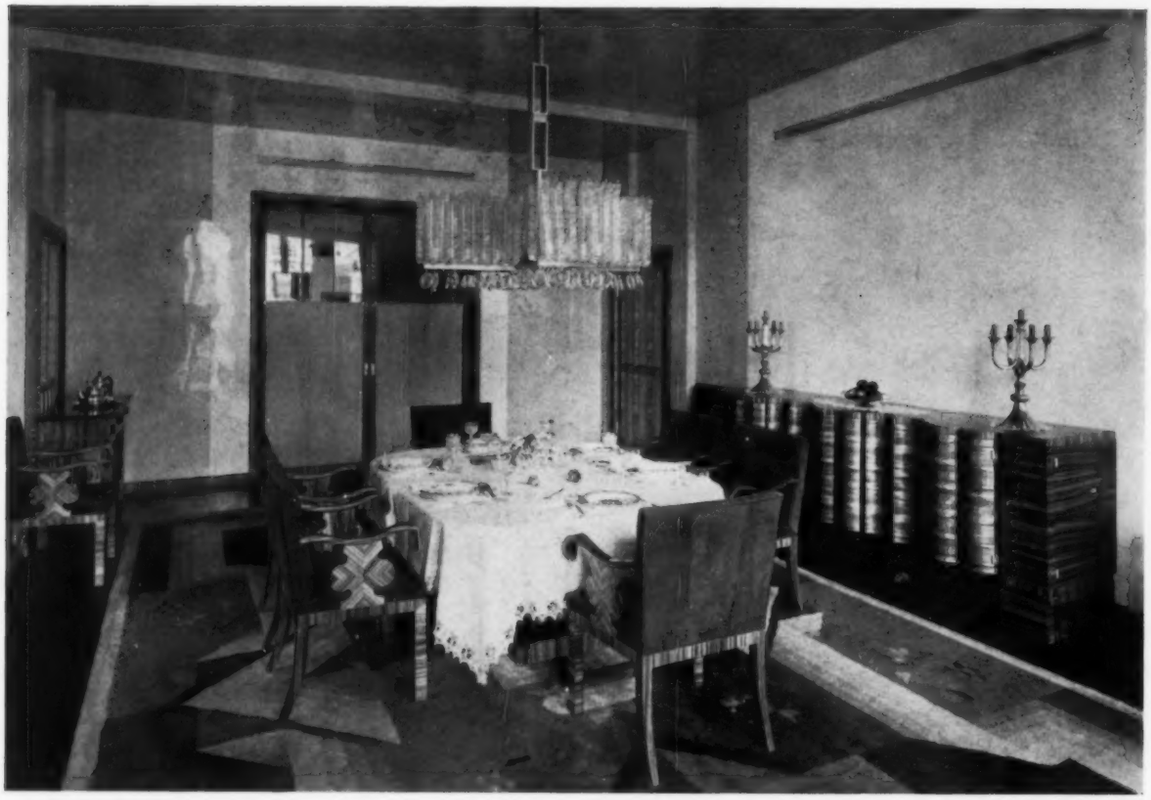
Editor's Note: The foregoing article is a translation of the address Professor Bruno Paul delivered in New York last spring. This translation was prepared for and approved by Professor Paul for publication in THE ARCHITECTURAL FORUM. Illustrations were loaned by Lucian Bernhard.

Simplicity and Angularity Almost Japanese in Character Distinguish this Modern Stair Hall

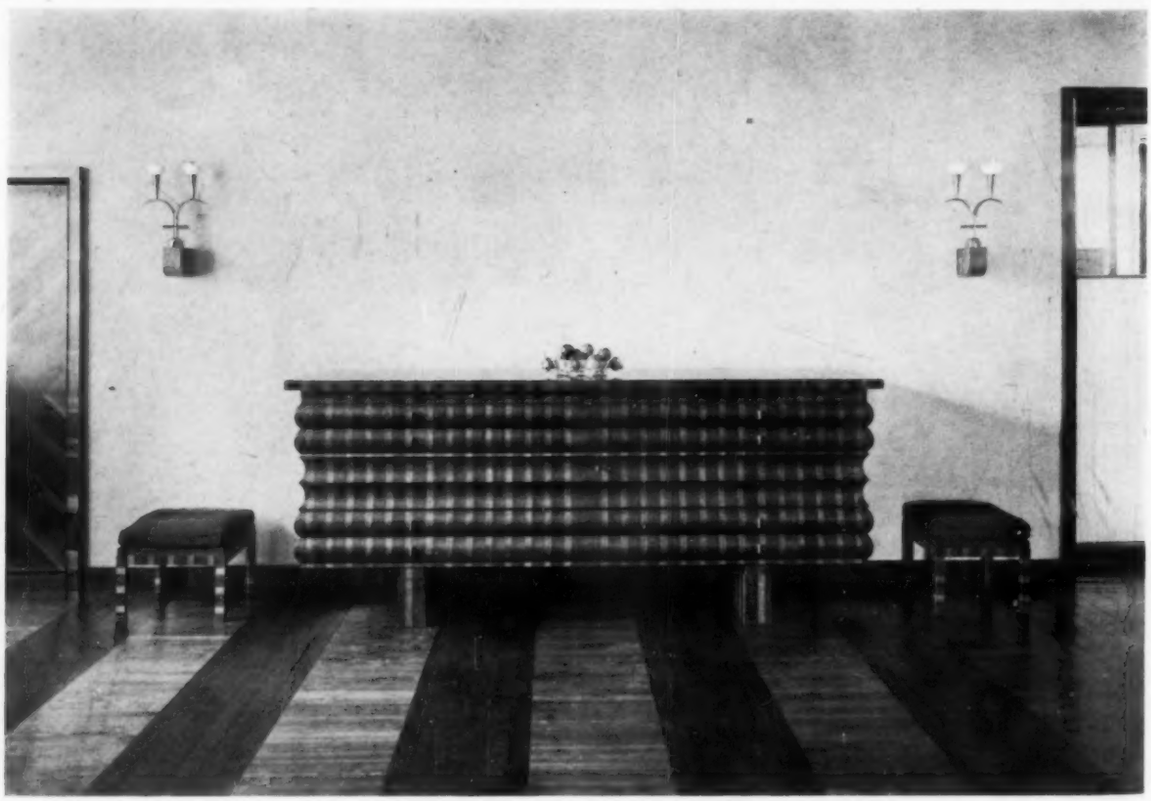
A Modern Dining Room Shown at Macy's International Exhibition in 1928, Designed by Bruno Paul, who is Recognized as One of the Founders of the Modern Art Movement

Although Modern, the Chairs are Comfortable and the Marble Mantelpiece Interesting

Two Views of a Modern Living Room in Which Color and Simplicity of Line and Mass, and an Interesting Wallpaper Give Distinction



Rug, Chairs, Sideboard and Center Electric Light are Good Modern Designs in Dining Room Furnishings



In the Floor as Well as in the Chest of Drawers Several Kinds of Wood are Used. Plain Wall Surfaces in Rich Color Well Set off the Dark Toned Wood of the Furniture

Photo. P. A. Nyholm

THE NEW YORK LIFE INSURANCE COMPANY BUILDING

CASS GILBERT, ARCHITECT

The Architectural Forum

THE
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VOLUME L NUMBER ONE

JANUARY 1929

USING SCALE MODELS ADVANTAGEOUSLY

BY
LE ROY GRUMBINE
WITH MODELS BY THE AUTHOR

THE first difficult problem that an architect encounters is that of salesmanship. He has to secure the coöperation of a client before he can produce. He has to sell something that does not yet exist,—something that probably requires the largest investment of anything the client buys.

The architect is an artist. Other types of artists,—painters, sculptors, poets, musicians, dramatists,—work more or less independently. They create by themselves. They usually produce first and sell afterwards. Their works sell themselves by direct appeal. The artist gets most of all of the money expended. The architect, on the other hand, usually gets only 6 per cent of the money expended. The artist creates art for art's sake. The buyer seeks art for art's sake. The architect applies art to a necessity. The buyer is seeking a necessity. So the architect, in addition to having to sell something that does not yet exist, has to sell his art in combination with a necessity, and in competition with those offering the same necessity without the art, at a lower price. And he has to sell 16 times as much per dollar earned! The qualities that make an artist and the qualities for successful salesmanship, are seldom found in the same individual. It seems as though they are the antitheses of each other. Witness the many instances where architects who are capable designers struggle all their lives with small practices, while the incompetent enjoy large and lucrative practices in spite of the many eyesores they are continually erecting.

How can an architect best demonstrate his value? Prestige is long and tedious in building,—never more so than in the case of an architect, because of the magnitude and rarity of the units he deals with; a doctor or lawyer has a hundred cases to one commission of the architect. Besides, prestige, no longer has the value it once had. Things move too fast in this age. What was good a short while ago, may no longer be good now. New things are coming thick and fast. What is best for the case in hand, is all-important. Emerson's little "mousetrap" theory no longer applies. Competition is ever increasing, making it easier for the buyer, and since the human animal is so likely to take the easiest way, the successful seller must display his goods and take them to the buyer.

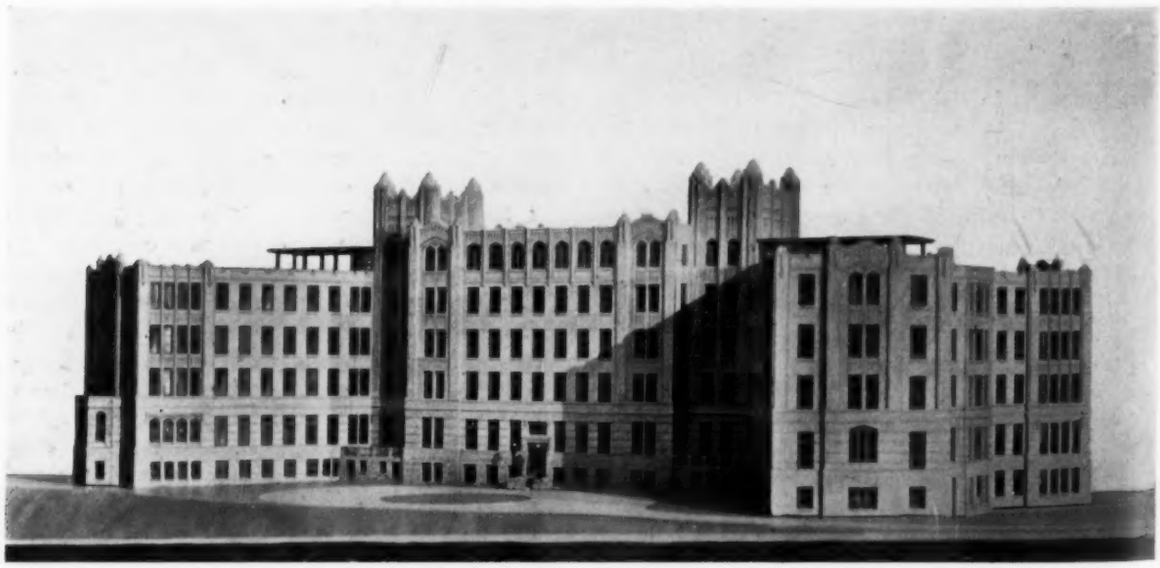
How can an architect do this? In no way so well as by means of a scale model. Not many years ago a nationally known shoe manufacturer of many years' reputation, lost two million dollars' worth of business in one year, simply because he continued to make a good thing in the same way. People of this age demand *new* things. The architect who presents his designs in model form, appeals to this demand. What is more enduring than building? What is more required by the people? What else absorbs as much capital? Even the sight of a modest residence has to be endured, or is enjoyed (as the case may be) by thousands of passers-by, daily. It continually irritates or pleases the owner and his family and guests as long as the owner lives there, which is the greater part of each day for a large part of his life. One is constantly in contact with buildings, either outside or inside, at home, at work, or traveling. Why should not buildings, of all things, be beautiful, and be made to give visual pleasure as well as to render efficient service?

To help make buildings more beautiful, to eradicate irritating ugliness, to further the cause of good architecture, is the mission of the scale model. Most people cannot or will not take the trouble to visualize. Sales experts tell us that few people can be "sold" on reason. Most people must be appealed to through their appetites or senses. A model does this. It diverts the attention from dollars to be expended and focuses it on something to be desired. It gives the prospective buyer something tangible, something definite. It dispels doubt. It creates enthusiasm. The client is interested in what the architect is going to do for him, not in what he has done for others. The model removes the buying of architecture from what is akin to a mail-order-from-catalog description, cash-in-advance matter, to a see-it-before-you-buy proposition. A model gives the architect the advantages other artists have,—of expressing himself independently of commissions; of creating first and

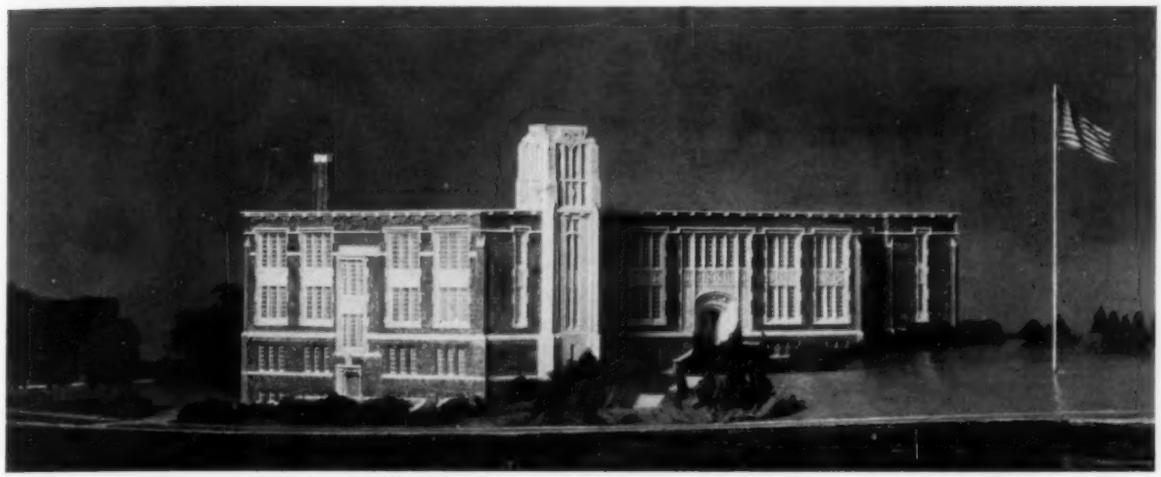
One-sixteenth Inch Scale Model of Longue Vue Golf Club, Pittsburgh
Bruno Janssen, Architect
A. D. Taylor, Landscape Architect

letting the result sell itself. It gives him a chance to display his wares immediately, without having to rely on prestige or to wait for a client.

All the elements that enter into the artistic side of architecture (and they are the same in all the various arts),—namely, form, color, harmony, contrast, composition or grouping, and central feature or climax,—can be as well portrayed in a scale model as in the building itself. To what extent a building approaches an architectural ideal, or is merely a constantly irritating eyesore, is determined by the preliminary studies (or lack of them). It is a mistake to put off making the model until various points have been decided and the preliminary scheme accepted by the owner, on the theory that it is useless to have a model if it's not going to be like the finished building. It is to help decide how the building shall look that a model is most useful, so obviously the model must be made before the decisions are made. It is not at all necessary that the model conform to the completed building in all details. The model should be the architect's presentation to the client of his design. Appropriate floor plans and section drawings, to show the interior arrangement, should accompany the model, but no rendered elevations or perspectives are needed. It is possible to use models effectively in this way, and the cost is not prohibitive. Models should be treated in the same manner as perspectives. They should of course be truthful, but photographic exactitude should not be attempted in one case any more



Model of Children's Hospital, Cincinnati, with Future Additions
Stanley Matthews—Elzner & Anderson, Associated Architects

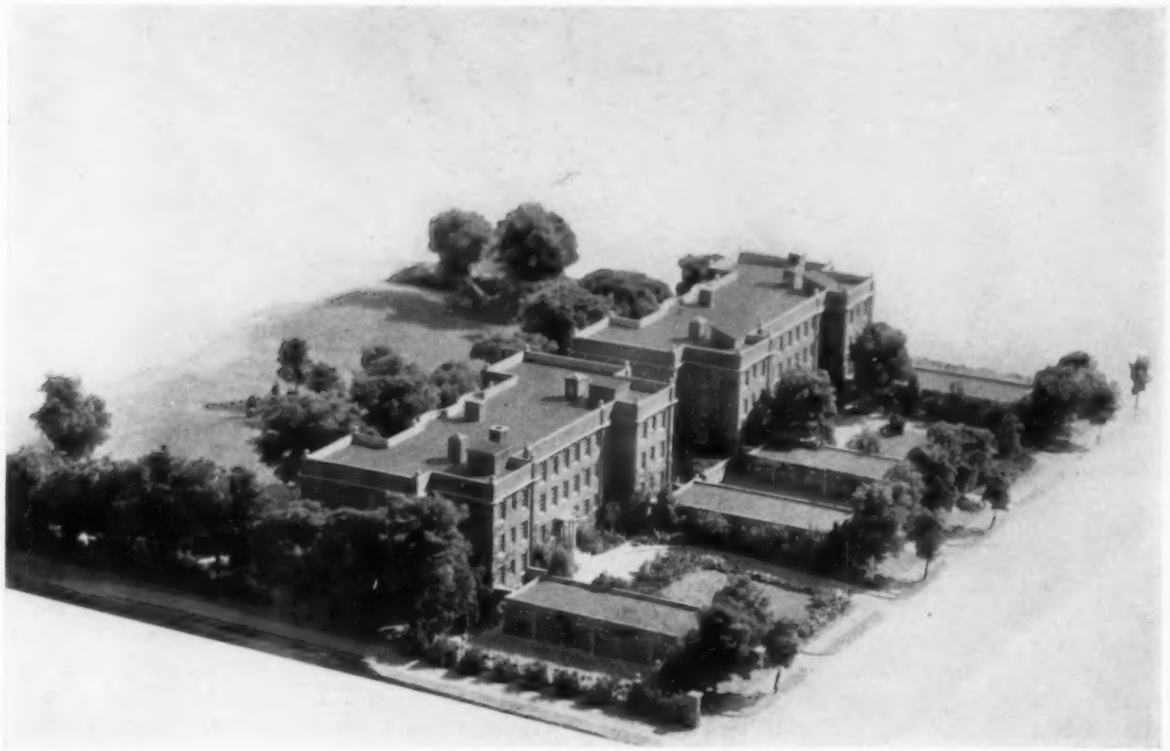


One-sixteenth Inch Scale Model of Coventry School Building, Cleveland Heights
Franz C. Warner, Architect

than in the other. Models should not be too elaborate. They should be "sketched" in the same way a perspective would be. Only the essential features should be shown. For this kind of a model, cardboard is the best material to use. It can be laid out and cut out with T-square and triangle on the drafting board. It takes various color mediums well and admits of "rendering" textures of materials and minor details. For the best effects and because of the exigencies of the materials used, a scale should be selected that will make the model 1 to 2 feet long. One such model usually can be made for what two or three perspectives would cost. As a model makes rendered perspectives and elevations unnecessary, it really costs little if any more to present a study in model form than by the customary perspectives and rendered drawings. Sketch models of two or more schemes, by which to compare relative merits, are of more value than one more detailed model later on.

The architect will find a model helpful to himself, in working out the design. As an illustration, take a tower with an octagon top on a square base. The writer's experience has been that invariably, although the drawings show ideal proportions, the model reveals that the top has been designed too narrow for the base. This was true even in a case where a carefully laid out perspective, taken at the 45 degree angle as a check, failed to reveal what the model showed. Where two or more architects, or architect and landscape architect, are associated on the same project, and one

Model of the Hardesty Residence, Daytona, Fla.
Martin L. Hampton, Architect; E. H. Ehmann, Associated
A. D. Taylor, Landscape Architect



Model of Garden Apartments, Cleveland
George B. Post & Sons, Architects
A. D. Taylor, Landscape Architect

contends, for example, that a certain wall should be constructed with a batter while the other maintains that it should be perpendicular, by having a model to refer to, they may readily agree as to which is the better scheme.

It is, however, in discussions between architect and client that the model is most helpful. It offers a real means of communication between the two. The conventional portrayal of architectural designs is artificial and often ambiguous, and sometimes even deceitful, to the lay mind. Anyone can understand a model. If the building is for an individual and of a private nature, the personal tastes of the client are important, and a sketch model helps the architect and client to understand each other; it helps the architect to discover the client's preferences and personal prejudices, and it aids the client in appreciating the architect's creations. Erroneous conceptions are avoided. A model often more than saves its cost by making unnecessary costly alterations.

If the building is more or less of a public nature, where decisions had best be left to the architect, and the architect has committees or trustees to deal with, a more detailed and carefully finished model of what the architect deems the best solution will help to convince the various members and to get action. If some member of the building committee argues for an impractical or inferior scheme, a model readily demonstrates his error. How often, after working out a good design, the architect meets with delay and postponement! The writer knows of many instances where the architect gives the model full credit for getting the order to go ahead,—for "selling" the client.

Incidentally, in this connection, a model often serves another very valuable function in helping to arouse public interest in a project,—by being conspicuously exhibited, as, for example, in a case involving bond issues or a drive for funds. Subscribers like to see just how their money is going to be used. A few years ago in Cleveland, within a short space of time ,four prominent public money-raising drives took place. Of these four, two were for hospitals and two for colleges. In each of these pairs, one got the quota on schedule and one did not; but the two that did had scale models of the proposed buildings publicly exhibited, and the two that failed had no models. While this does not necessarily prove that the models were responsible for the outcome, these facts would indicate that a model has influence. In this way alone a model may earn its cost many times over.

When an elaborate project is being contemplated and planned, only a small portion of which is to be built in the immediate future, a model helps psychologically to fix the scheme and to insure its

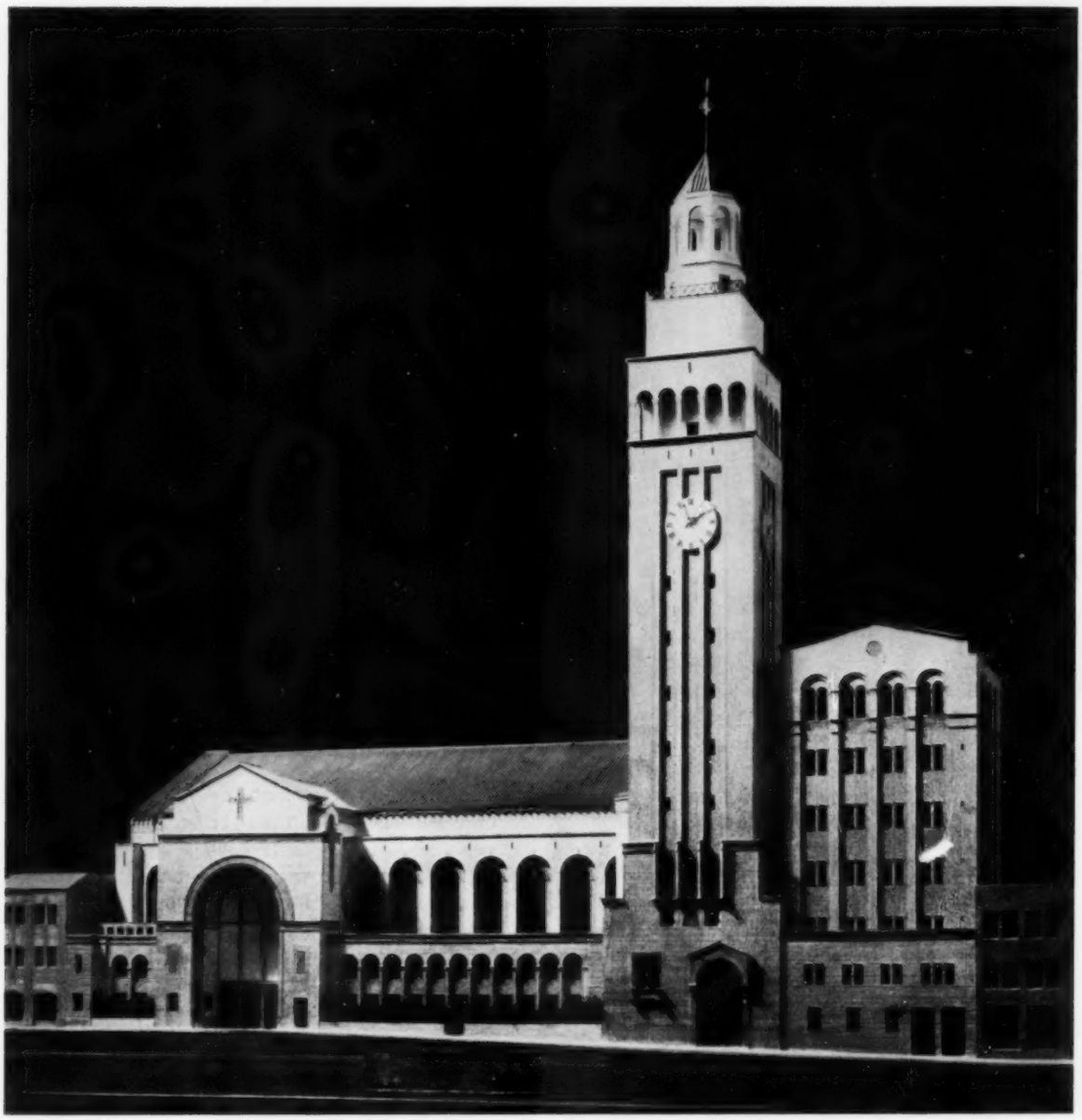
One-eighth Inch Scale Model of a Residence at Madison, Wis.
Law, Law & Potter, Architects

completion by keeping it in mind, making it less easy for something inferior to be substituted by a cheaper or less competent architect, or for a future administration to graft on. When it is planned to build only part of a group or building, leaving the rest to be completed at some future time, the model can be made with the future addition detachable, showing both the part to be immediately built and the finally completed project. To show two or more different designs for some particular feature, as a tower, the model can be made with interchangeable parts. Special features, such as an ornamental doorway, a cornice, or other like details, are best shown in detail on separate models, rather than by enlarging the scale of the model of the whole building sufficiently to portray them, which would result in needless duplication.

The interiors of auditoriums, churches, theaters, lobbies, and similar buildings, are effectively portrayed by models. The model should be constructed in sections, usually six, to correspond with the floor, four walls and ceiling, each section removable while leaving the other five intact, for the purpose of viewing. In this way the model can be viewed from all angles, and it affords a complete check on the seating arrangements. The interior and exterior can be shown in the same model, but it is usually more satisfactory and less expensive to make separate models. In buildings of a monumental nature, where time and expense are not important considerations, an additional model at a larger scale, showing more detail, made in conjunction with the preparation of the working drawings and specifications, is valuable. Sometimes an exact model of the plat and topography in their original condition is helpful to the architect in developing a layout, especially for a group of buildings.

In some cases it is practical to "sketch model" the various buildings and units separately, and to move them about in various positions on the plat, in order to try out different schemes. In this way all possible combinations are easily and quickly tried out and effectively studied, and the time and labor of drawing up the various schemes are saved. In portraying group plans, it requires a great many drawings and perspectives to show even a small portion of the many interesting views and vistas. The cost of preparing a few such drawings soon equals the cost of a model that would show all from every angle, doing so definitely and without error. A group plan or landscape model should be at a scale to keep its maximum width less than 4 feet. However, a large group plan model can be made in sections or developed by installments, first modeling the buildings individually, and later adding the landscaping and connecting sections.

Photographs of models are excellent for publication purposes. If surroundings and setting are important features, these can be drawn in either di-



One-eighth Inch Scale Model of a Preliminary Study for the Euclid Avenue Baptist Church, Cleveland
Walker & Weeks, Architects

rectly on an enlarged photograph of the model or on a tracing from it with much less labor than it would take to lay out a separate perspective. Cardboard models are light in weight, and are not nearly as fragile as those made of plaster or clay. They are easily carried about and are convenient to take to committee meetings. A collection of such models, having served as preliminary studies, would form an interesting and useful exhibit in the architect's reception room,—or they can be easily stored and filed for reference. The use of models is steadily increasing. Those architects and landscape architects who use them are enthusiastic over them, and it seems certain that the time is coming when presentation will be made largely by models.

STEEL FRAMING FOR A THEATER

BY
MILTON TUCKER
DRAWINGS BY CHARLES J. McGINLEY

IN the designing of steel framing for theaters, the most perplexing problems are usually found in the balconies, or more precisely, in the balcony trusses. For here it is that we have to deal with heavy loads, combined with long spans and limited depths. Intersecting trusses and cantilevering often add to the difficulties and require complicated connections seldom met with in other buildings.

The Mastbaum Theater, Philadelphia's newest and largest playhouse, is no exception to this rule. In fact, in very few theaters can trusses be found with the length and load, combined with the limited height, which confronted the engineers engaged on this work. The modern theater, of course, does not permit the use of any intermediate columns under the balcony. In the Mastbaum Theater, the two main balcony trusses were required to span 131 feet, center to center of the supporting wall columns. Although main balcony truss MT2 (Fig. 1) was allowed a depth of 23 feet, main balcony truss MT1 was limited to a depth of 15 feet, and at the same time it was required to carry a load of 1200 tons. As a result, the stresses developed in the various members ran very high. In addition, the three "vomitories," or passages from the balcony to the second promenade, pass through each truss. In the case of main truss MT1, the vomitories take up the entire panel opening; this precludes the use of any diagonal members in three panels, i.e., the center panel, and the second panel from each end. This difficulty was overcome by designing the top chords as plate girders to take the shear in the panels. These girders occur not only over the open panels, but over each adjoining panel. In the adjoining panels, part of the shear is carried by the web plates of these girders, and part by the diagonals.

Main truss MT1 was designed with double top and bottom chords and with a single-web system between the double-chord members, as can be seen in Fig. 2 which shows the uncompleted truss. The web members consist of rolled sections and cover plates, while the chord sections are a combination of angles, flange plates, and cover plates. Both top and bottom chords were double-laced throughout their entire length. All connections were designed with the rivets in double shear in order to cut down the number of rivets. All rivets used were 1 inch in diameter. Field holes were punched 15/16 inch in diameter and then reamed for 1-inch rivets after the truss was completely assembled in the shop. Of course the truss was disassembled again for transportation. The top and bottom chords were each shipped in three sections. Very little difficulty was experienced in driving the rivets in the field, due to the accurate punching in the shops of the fabricators, and the efficient field organization of the erectors. Fig. 3 shows a few of the 25,000 rivets used in this one truss (MT1); of these, 21,000 were driven in the shop and 4,000 in the field. The completed truss, of 173 tons, is shown in Figs. 3, 4 and 5, in which

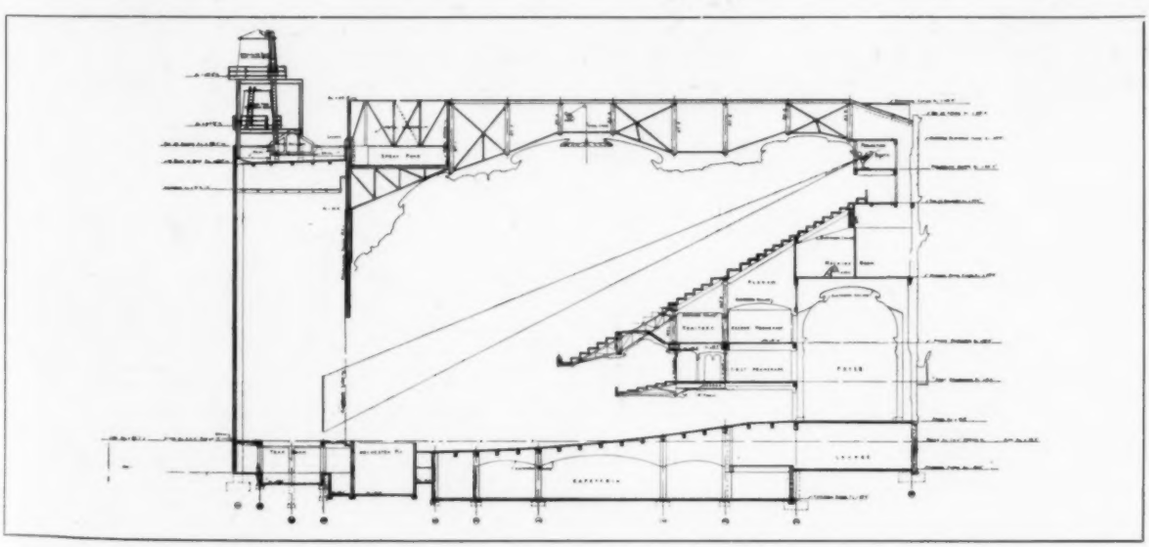


Fig. 1. Longitudinal Section, Mastbaum Theater, Philadelphia
Hoffman-Henon Company, Architects and Engineers

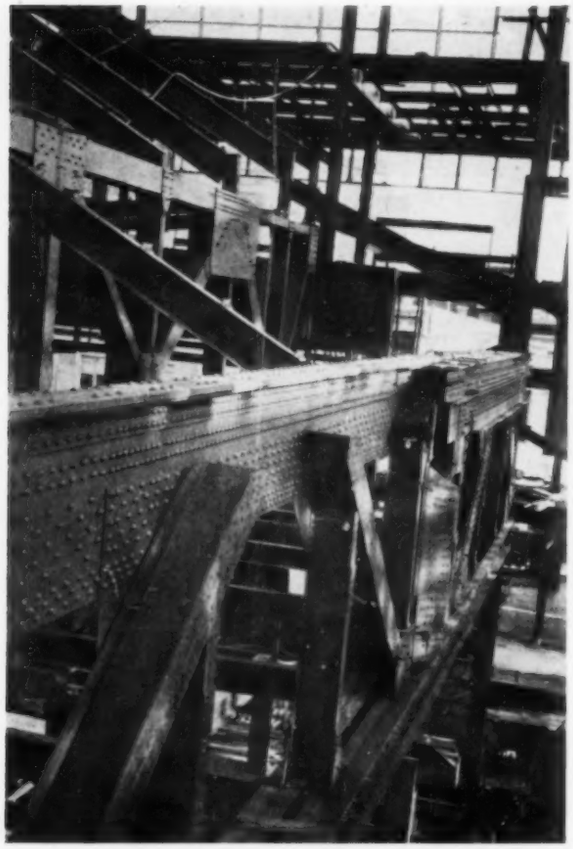


Fig. 2. Main Truss MT2, Twenty-three Feet Deep

are also shown the open panels for the vomitories.

In Figs. 6 and 7 is shown the layout of all the balcony trusses. In Fig. 7, the truss with the heavy top chord running to the wall column is main truss MT1. Back of it is main truss MT2, which offered very few obstacles owing to the greater depth available (23 feet); the resulting truss weighs 65 tons. Main truss MT2 is made up entirely of rolled sections and cover plates. A good idea of the comparative sizes and weights of the two main trusses can be obtained from Fig. 8. To support the front of the balcony required an additional truss, but due to the slope of the balcony, the available depth between the floor and the ceiling below becomes less and less as the front was approached. The design of MT1 presented difficulties enough, but the design of fulcrum truss FT1 offered even more. To make possible the use of a rational design it was necessary to cut down the length of truss FT1 to a practical figure. This was accomplished by introducing the diagonal girders DT1 and DT2 to cut off the corners and carry FT1. This at once simplified the designing of FT1.

The diagonal girders are supported at one end by the main balcony truss MT1 and at the other end by wall columns. Each girder weighs 30 tons. These diagonal girders were originally designed as trusses, but, due to the shallow depth obtainable and the high stresses in the web members, difficulty was experienced in developing the joints. This made necessary the plate girder design. As a matter of fact, many of the balcony trusses could have been designed as girders, i.e., with solid webs; but since the space between the balcony floor and the ceiling below is occupied by a plenum chamber in connection with the heating and venti-

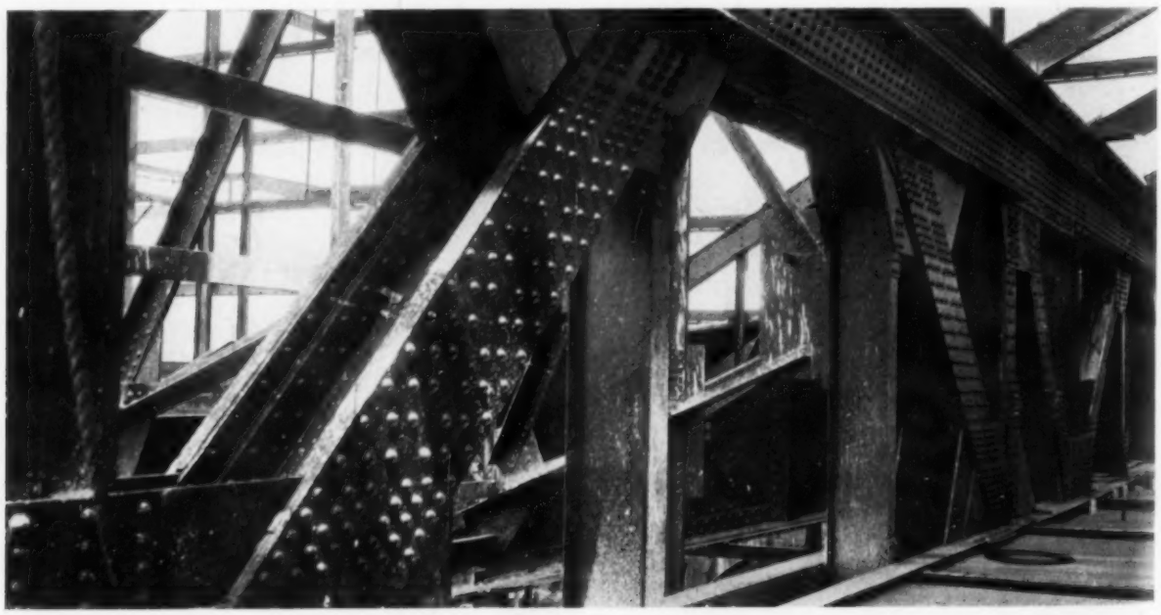


Fig. 3. Truss MT1, Fifteen Feet in Depth, Supporting 1,200 Tons

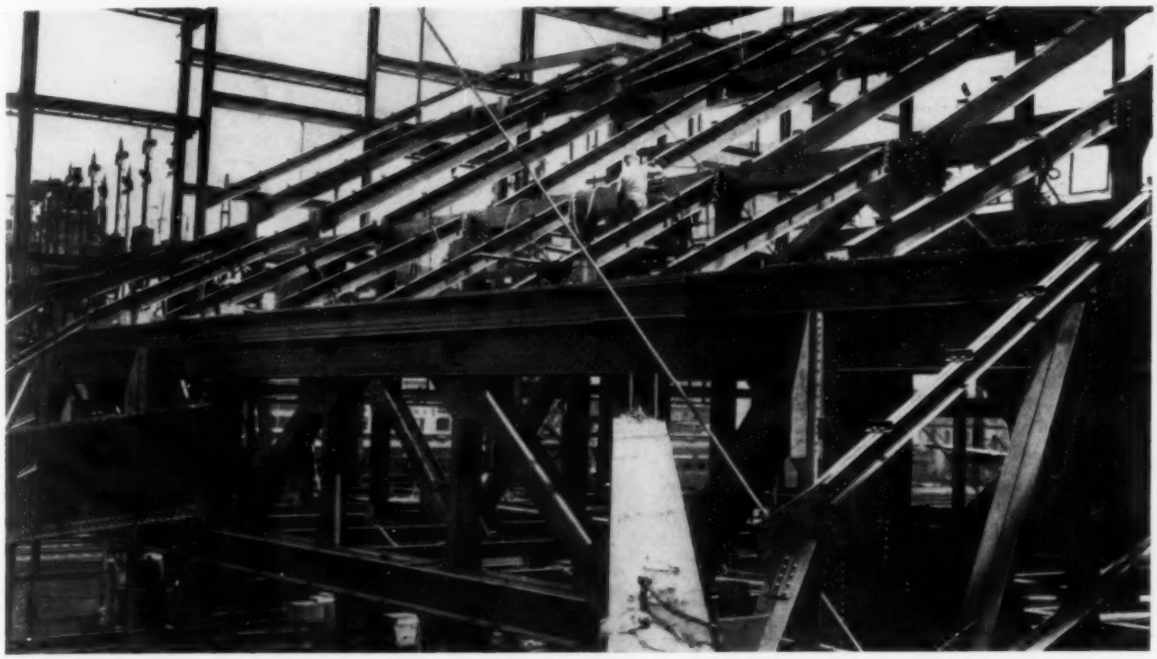


Fig. 4. Truss MTI, Showing Open Panels for "Vomitories"

lating, it was necessary to use trusses to permit the free passage of air to all portions of the plenum chamber. The fulcrum truss FT1 is 83 feet long, weighs 35 tons, and was brought to the site completely assembled. Figs. 6, 7 and 9 show the manner in which the diagonal girders carry the fulcrum truss.

The very front of the balcony is supported by ten cantilever trusses in the manner shown in Figs. 6, 7 and 9. These cantilever trusses are supported at the fulcrum point by the fulcrum truss FT1, and at the rear end they are anchored to the main balcony truss MT1. The balcony seats rest on reinforced concrete slabs, or "steppings." From the balcony fascia back to the main truss MT1 these steppings are carried on the cantilever trusses. The portion between the two main trusses is carried on rolled steel sections framed between the trusses. In back of MT2 is a line of columns coming up from the auditorium floor to the under side of the balcony. The steppings between these columns and MT2 are carried on rolled steel sections. Figs. 1, 6 and 7 show the supports for the concrete steppings. The top of the balcony between the line of columns and the rear wall is carried on three trusses, BT1,

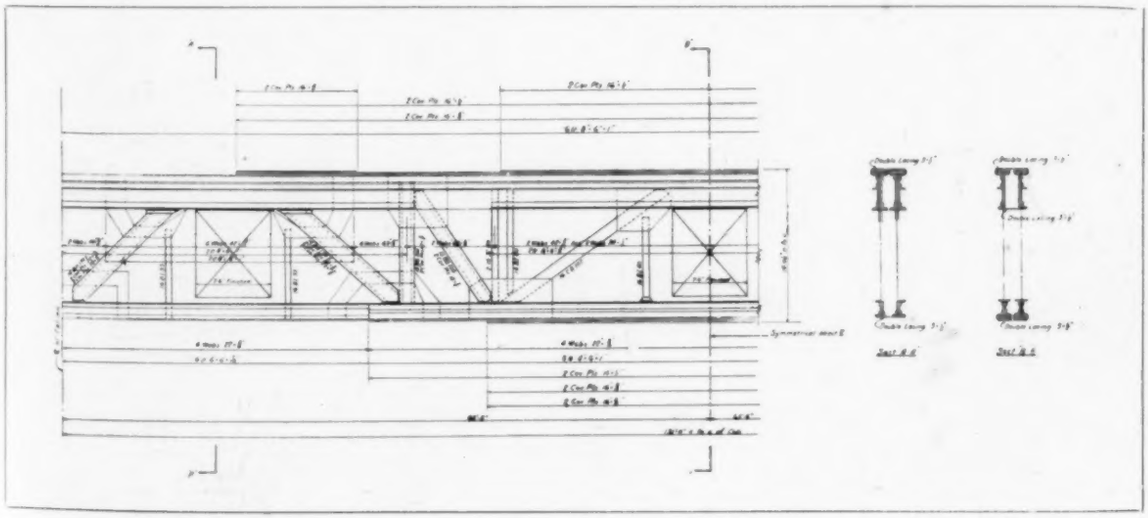


Fig. 5. Detail of Main Balcony Truss MT1

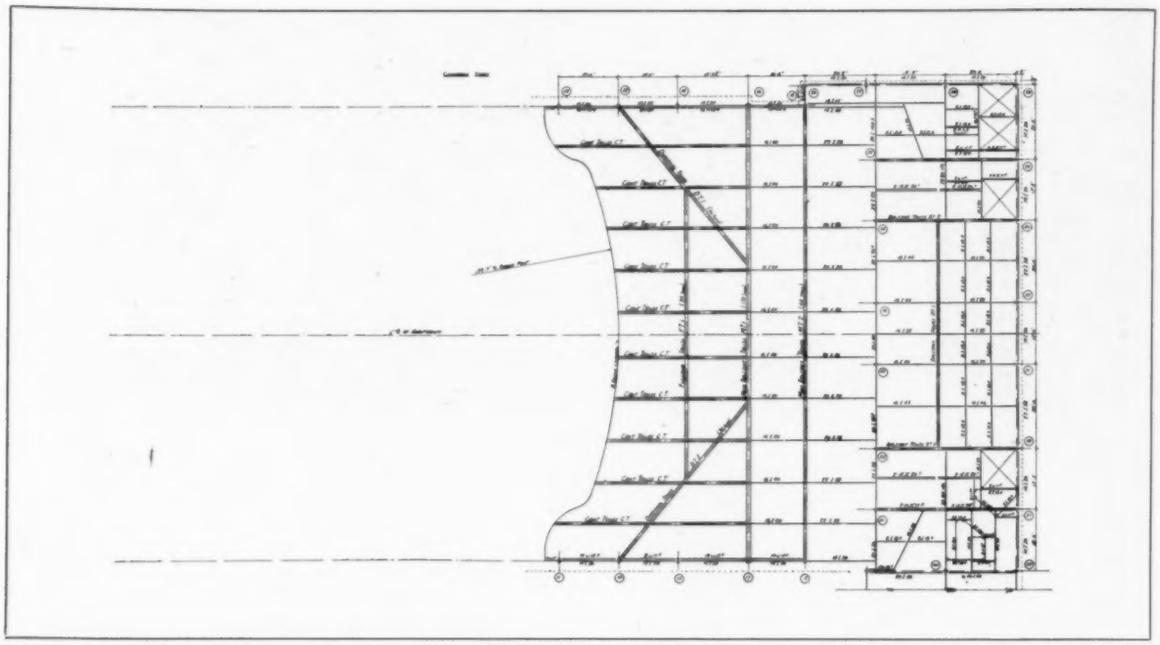


Fig. 6. Main Balcony Framing Plan, Mastbaum Theater, Philadelphia

2 and 3, and on rolled sections, as shown in Figs. 1 and 10.

As can be seen in Fig. 1, the lower or loggia balcony is slung under the upper balcony. The loggia balcony steppings are supported on cantilever trusses similar to the cantilever trusses in the upper balcony. These trusses are supported at the fulcrum point by hangers up to the main balcony truss MT1, each hanger consisting of two 6 x 4 x ½-inch angles. This accounts for some of the 1200-ton load figured for MT1. These hangers are concealed in imitation stone columns forming an ornamental arched colonnade. The rear ends of these cantilever trusses are anchored by struts up to the main balcony truss MT2. The rears of these cantilever trusses were made up as girders with solid webs on account of the shallow depth. However, in order to pass fresh air ducts from one side of the balcony to the other, it was necessary to burn six 10-inch diameter holes in the web of each girder. These cantilever trusses, with the holes in the webs, can be seen in Fig 7, if carefully observed.

The main roof slab is a poured-in-place gypsum slab, 3½ inches thick, of the suspension type. The slabs are carried on channel iron purlins which

Fig. 7. Several of the Ten Cantilever Trusses Supporting the Front of the Balcony

Fig. 8. Comparative Sizes, Trusses MT2 and MT1

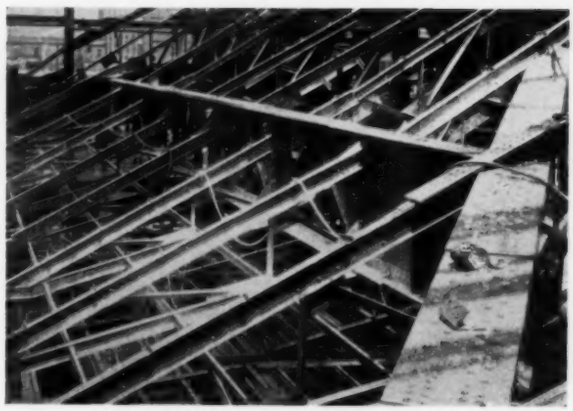


Fig. 9. Cantilever Trusses to Support Front Balcony

are supported by the roof trusses. The latter are of the Warren and Baltimore types, and vary in weight due to the varying loads carried. See Figs. 1 and 10. From the truss at the rear is hung one side of the projection booth and broadcasting room, with floor area of 138 feet by 21 feet, figured for a dead and live load of 225 pounds per square foot. The other side of the projection booth is supported on wall columns. This roof truss is 139 feet long, 13 feet deep, and weighs about 30 tons. The top of the truss is 113 feet above the auditorium floor. This truss was hoisted in two sections and shored up from the balcony as shown in Fig. 11. The other seven roof trusses were hoisted from the auditorium floor, fully assembled. The trusses over the domed ceiling carry the main chandelier. The latter was figured at 2 tons, but this is only a "drop in the bucket" as compared with the total loads on the roof trusses. Roof truss RT1 (over the orchestra pit) carries the spray pond for the cooling system, 35 feet by 106 feet in area. The main ceiling and the walkways over the ceiling, which provide access to the cove lighting and to the chandelier winches, are all hung from the roof trusses and the purlins. All the trusses are adequately braced at the top and bottom chords. In addition, there are three rows of cross frames for further strengthening.

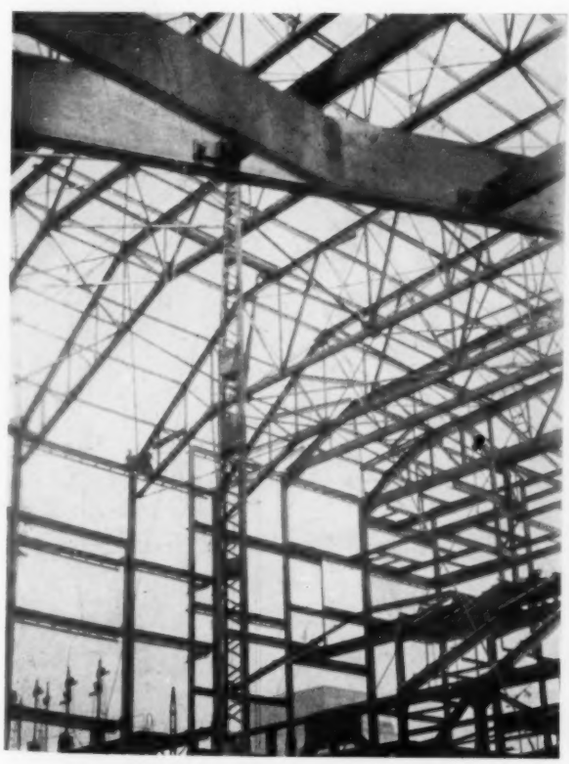


Fig. 10. View of Roof Trusses

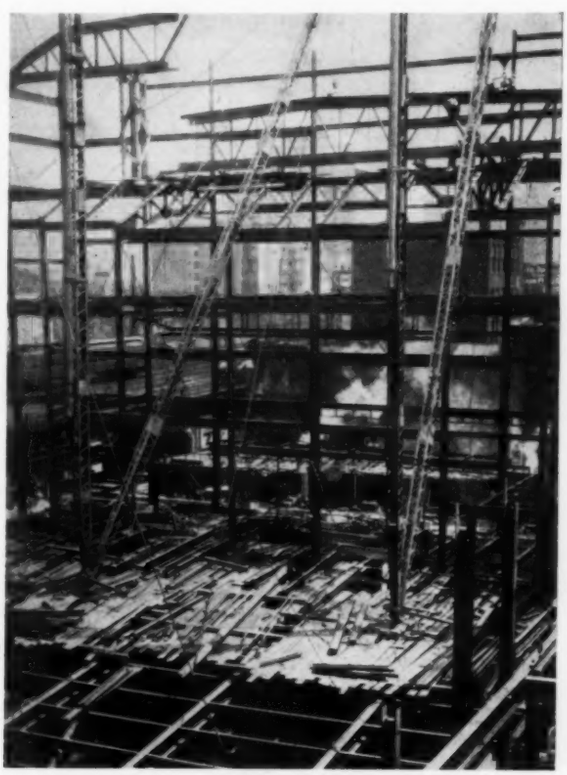


Fig. 11. Truss Being Placed

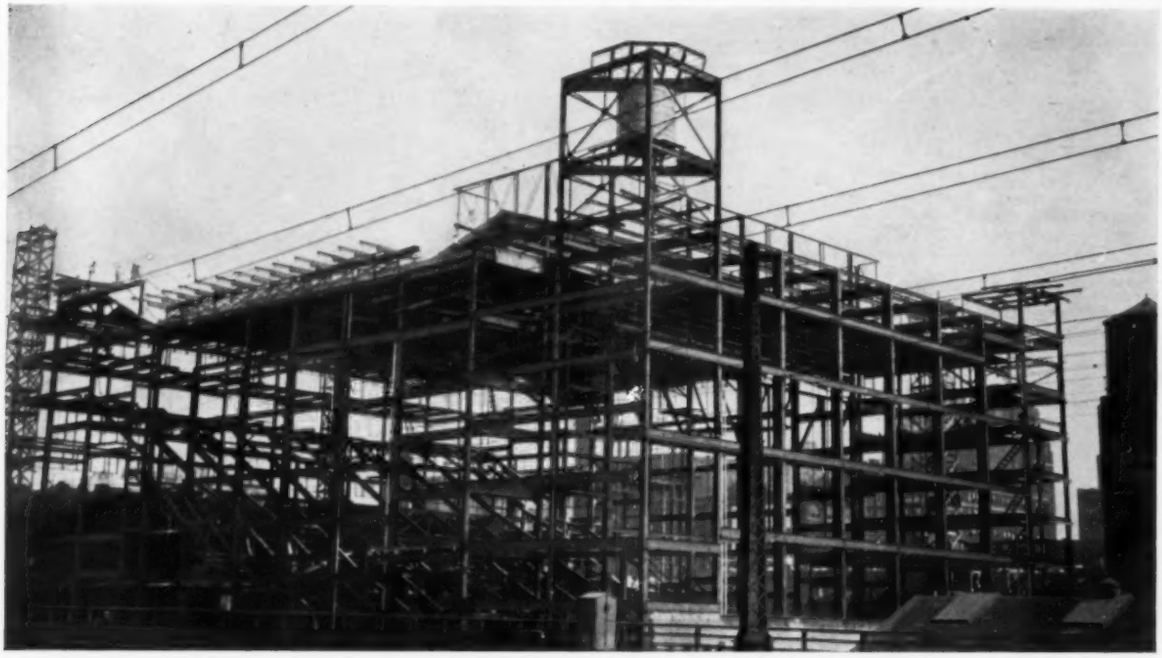


Fig. 12. General View of the Framing of the Mastbaum Theater, Philadelphia
Hoffman-Henon Company, Architects and Engineers

The proscenium wall over the proscenium arch, or stage opening, is carried on a truss made of angles. Due to the practically unlimited depth available, this truss is comparatively light, weighing only 30 tons. The width of the proscenium opening is 75 feet. In the back stage wall the columns are unsupported for a height of nearly 90 feet, due to the necessity of having a clear, open space to handle scenery. To take care of this condition and to keep the unsupported lengths of columns within the allowable stresses, as prescribed by the Philadelphia building code, these columns were made of 24-inch I-beams. In the other direction, the columns are tied into the spandrels, which occur at 14-foot intervals, by ⅜-inch plates. The masonry of the rear stage wall is 13 inches of brick, as required for a fire wall. Other walls above grade consist of 4 inches of brick and 8 inches of hollow tile. Walls below grade are reinforced concrete and are chiefly retaining walls.

The foundations are of reinforced concrete, of the spread type. Due to the head of water on the floor of the sub-basement, 28 feet below the sidewalk, a 12-inch thick hydrostatic slab was required. This, of course, was designed as an inverted floor slab. In general, the theater frame is of reinforced concrete and steel. The completed steel framework, totaling about 1800 tons, is shown in Fig. 12. Here the house tank is seen in position, and, over it, the platform for the sprinkler tank. In back of the tank appears the light framework for the spray pond louvers. Directly beneath this can be seen the proscenium truss over the stage opening. At the extreme right is the framing for the pent house for the dressing room elevator machinery. The dressing room section is literally an eight-story building, isolated from the rest of the theater by fire walls and automatic fire doors. Two elevators serving the balconies will be located in the far left corner near the temporary service elevator shown. In Fig. 12, the balcony steel can be seen, as well as the 24-inch columns in the rear stage wall. The steel pole in the foreground supports the wires of the Pennsylvania Railroad.

When finished, the theater will seat 4709, of which number 2387 seats are on the main floor, 433 in the loggia balcony, and 1889 in the main balcony. The structural designing was done under the supervision of John E. Williams, the engineer of the Hoffman-Henon Company, Philadelphia.

PROVIDING FOR RADIO AND AMPLIFYING INSTALLATIONS IN LARGE BUILDINGS

BY
KARR PARKER
CONSULTING ENGINEER

THE tremendous growth of radio broadcasting during the past few years and the almost universal public demand for this service have brought a new problem to architects. What provision should be made in the construction of clubs, hotels, hospitals, apartment houses, schools, auditoriums, etc., for radio installations? Closely allied to the radio installation is the voice-amplifying or "public address" installation. Auditoriums and hotel dining rooms have been increased in size until the voice of a speaker cannot be heard distinctly throughout the rooms and must be amplified by means of microphones and suitable reproducers. If proper provision is not made for conduit and wiring when the building is built, it is difficult to make a satisfactory installation later and to get the microphone and reproducer outlets in the correct locations. Furthermore, it is expensive and unsatisfactory to channel finished surfaces for conduits and to patch and refinish walls and floors. Large public buildings should have provision made for radio and voice-amplifying systems, and the conduits and outlet boxes, etc., should be built in with the building.

Certain general rules will apply to a central radio installation for a large apartment building, club, hotel or hospital. In this type of installation one or more programs are received in the radio control room and supplied to the guests or tenants over a wiring system. Usually the equipment operates from noon until midnight, and the guest can switch his loud speaker or head set off and on or select his program as desired. There is no receiving or amplifying apparatus in the guest room, and therefore no skill or attention on his part is required. The programs being received on a high class equipment by a skilled operator in the control room can be transmitted to 2,000 rooms and give radio reception that is far superior to that which the average user would get from his own radio set. In large, high buildings it is practically impossible to get satisfactory radio reception by individual sets in the rooms, due to the absorption of the ether waves by the steel frames of the buildings. There is an increasing tendency for the landlord to supply radio service to his guests by a central system in the same way that heat and light are supplied.

The design of a central radio system starts with the location of the radio control room. This should be on the roof or top floor of the structure unless there is also a broadcasting station on the building. In the latter case, it should be located as far from the antenna of the station as possible, but not lower than the third story of the building. If public address equipment is also to

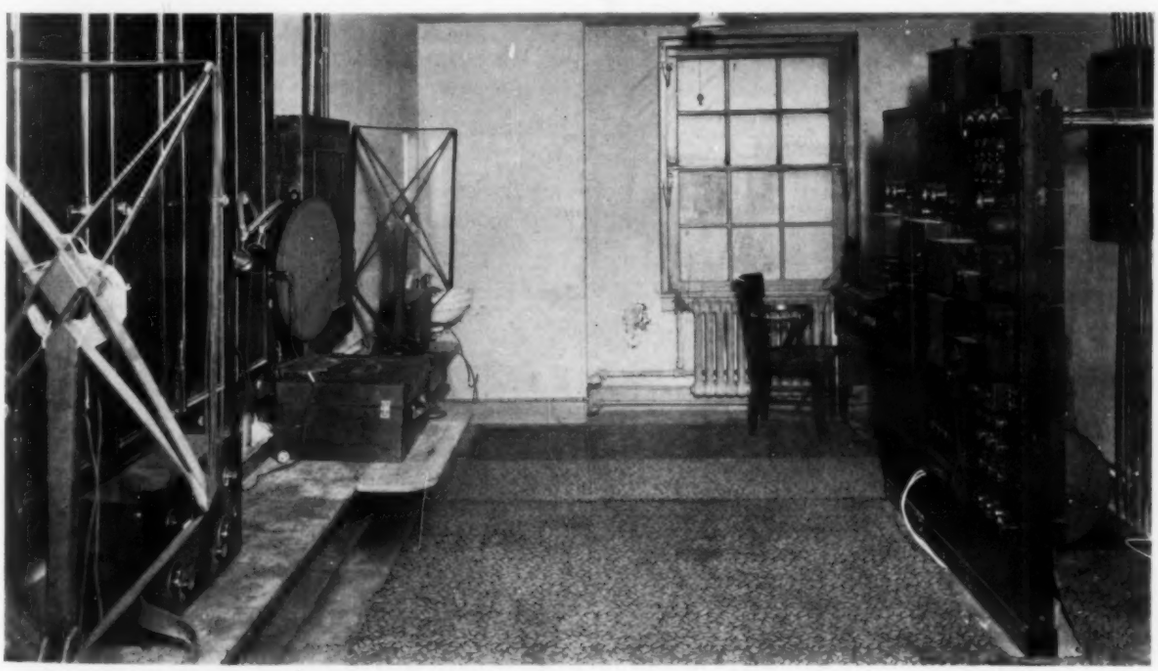


Fig. 1. Radio Control Room for a Large Installation

Fig. 2. A Lever Type Selector

be used, the room should be approximately 15 by 20 feet in size; if radio equipment only, it may be reduced in size to 10 by 10 feet. It is advisable to provide sufficient room for the equipment and operator. Figs. 1 and 5 show well arranged radio control rooms for a large radio and public address system. The architect should consult with the owner and determine whether the system shall carry one program only or shall distribute two or more programs. A pair of wires are required to every outlet in the building for each channel,—i.e., a three-channel service would require six wires to each outlet. The cost of installation increases greatly with additional channels, and also it is much more difficult to install the wiring for multiple systems because of inductive interference between the circuits which causes "cross talk" and a poor quality of reception.

The next thing to be determined is whether loud speakers or head sets or a combination of the two are to be used in the various rooms throughout the building. If it is a hospital, head sets located at the heads of the patients' beds are recommended because of the necessity for quiet. In an expensive apartment building, however, loud speakers with proper volume control will probably be desired. However, caution must be exercised in installing loud speakers in a large hotel or apartment building, especially around inside courts, as the collective noise of a large number operating at one time is objectionable. A study of each particular case and its acoustics should be made to avoid such a difficulty. A good general rule is to use loud speakers on large outside rooms and suites and to install head sets in the smaller inside rooms. Fig. 6 shows a radio head set installation suitable for hospitals or hotels.

From the terminal cabinet in the radio control room a complete conduit system must be run to the various outlets. Not more than 50 head sets or 15 loud speakers should be placed on one branch circuit, and the wiring for head sets and loud speakers must be run in separate conduits, as the current level is different for the two. These branch circuits should terminate on individual switches in the control room cabinet so that in case of trouble on any branch it can be quickly cut off and repaired without shutting down the entire system. The conduits are run in the concrete slabs, ending in steel outlet boxes in a manner similar to that of the lighting instal-

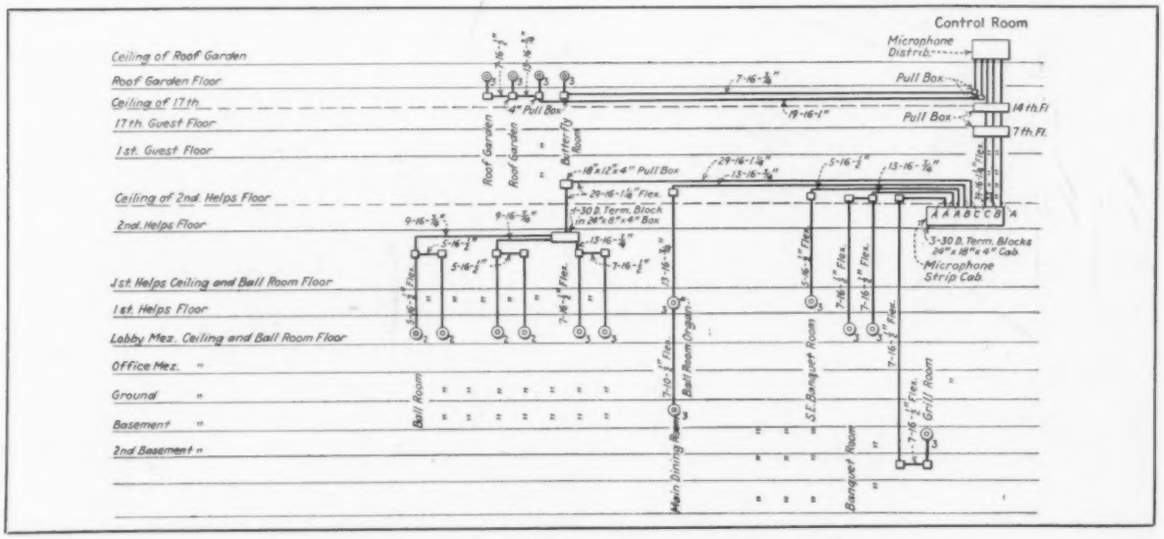


Fig. 3. Diagram of the Radio Wiring for a Large Hotel

lation. The wiring should be lead-sheathed in the control room; the entire system should be lead-sheathed, and each individual pair twisted on itself to minimize inductive interference if there is more than one channel. Special attention should be paid to the insulation of the cables. At the loud speaker outlets a plug-in receptacle (single or multiple type) with a small volume control dial may be provided with plate finished to match the hardware of the room. The guest selects different channels by simply plugging into the different holes in the receptacle. Special radio program selectors have been devised which may be built into the loud speakers or arranged for controlling head sets. Fig. 2 illustrates a lever type selector.

The receiving apparatus should be selective and made to "tune" sharply and should be of the heterodyne or radio frequency type with amplifiers of adequate capacity. The selection of the radio receiving apparatus, amplifiers and control room equipment calls for the technical advice of a radio engineer, and each installation should be worked out by a competent engineer. The head sets and loud speakers should be of the proper electrical characteristics to operate on the equipment selected. The arrangement of antenna and control room apparatus should be carefully planned in order to secure satisfactory operation. It is recommended that a magnetic reproducer be installed with a supply of phonograph records so that music can be supplied at all times independently of the radio reception.

The radio system may be combined with a voice-amplifying installation so that radio music, addresses and programs may be amplified and heard throughout large dining rooms, auditoriums and school rooms. Such an arrangement also permits of transmitting the voice of a speaker in the building over the central radio system simultaneously with the amplification of his voice in the auditorium. In a hotel, for example, an address by the President of the United States could be brought in over the radio from a distant city and amplified so that it could be heard at a banquet in the dining room at the time that it was transmitted throughout the hotel over the central radio system. Speeches at conventions and functions held in the hotel could be transmitted throughout the house so that guests in the rooms could listen to the speakers and to the orchestras playing in the hotel. This is also used in schools.

Fig. 4. A Panel Board of a Large Installation

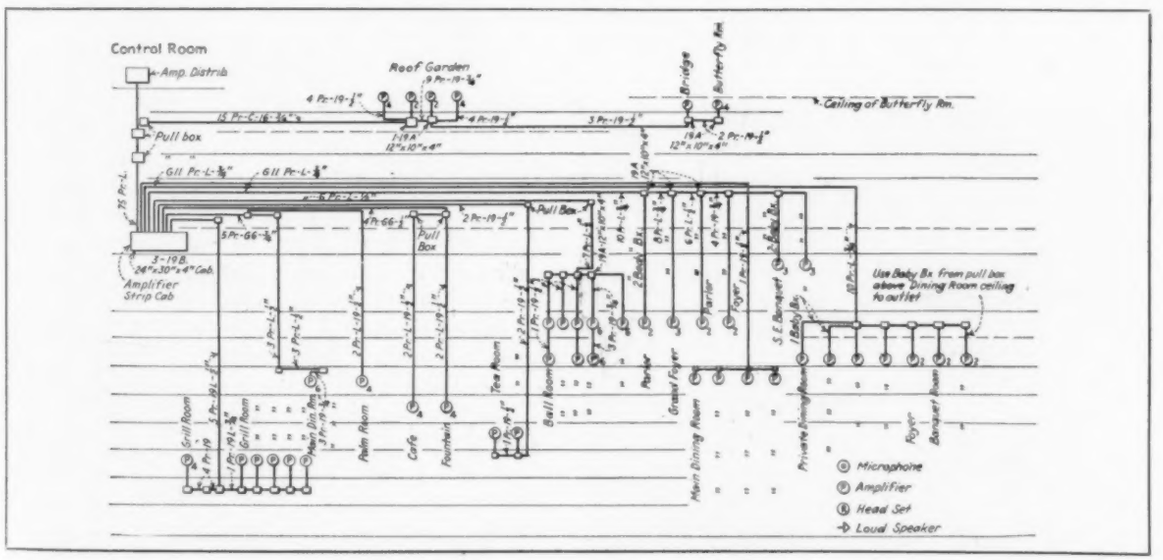


Fig. 3a. Continuation of Radio Wiring Diagram

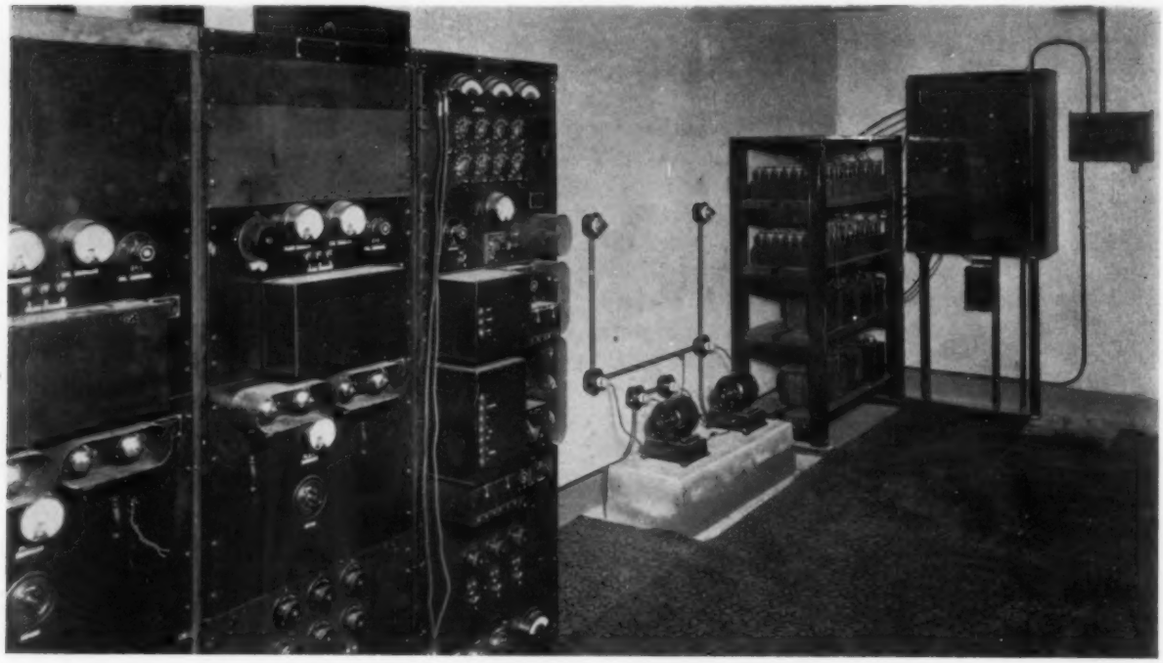


Fig. 5. Portion of a Radio Control Room Showing Panel Board

In designing the voice-amplifying system, microphone outlets should be provided in the dining rooms and auditoriums near the speakers' tables. For large rooms the horn type reproducer suspended above and in front of the table or stage should be used, grouping several horns if necessary so that the volume distribution is adequate. These reproducers should not be placed back of the microphone, or a "feed back" will result, with unsatisfactory operation. A large public address system control switchboard is shown in Fig. 4, and the wiring diagram of a large system is illustrated in Figs. 3 and 3a. In smaller rooms a cone type loud speaker or a horn type reproducer with a wider distribution than the conical horn type should be used. Conduit and wiring are run to the reproducer locations and terminated in receptacles into which the horns may be plugged.

Fig. 6. A Room Head Set in Use

In the radio control room a monitor speaker enables the operator to hear the speaker, and he can regulate the volume of amplification by means of his rheostats on the switchboard. The systems operate on 60-cycle, alternating current; if direct current only is available, small rotary converters must be installed to provide the alternating current. The cost of current for operating this equipment is negligible. At a rate of 2 cents per kilowatt hour, a large central radio system combined with a voice-amplifying installation can be operated 12 hours per day for a cost of 15 cents per day for electricity.

The general considerations applying to an installation as outlined here will aid an architect in determining the type of a central radio system that is desired for a particular building. The electrical design of the wiring system, selection of the apparatus and preparation of plans and specifications for the installation require the technical skill of a radio engineer who must work out each installation in order to get the proper results. Obviously, a poorly planned installation which is continually breaking down, giving faulty reproduction of speeches and music, would be a liability. If the system is properly designed, installed and operated, however, the maintenance cost is very low, repairs and current cost nominal, and service extremely dependable. There are large systems which have been operated for more than a year with efficient and practically uninterrupted service.

WILL ARCHITECTS BE BUSY IN 1929?

BY
C. STANLEY TAYLOR

EIGHTH ANNUAL BUILDING SURVEY AND FORECAST

THE prediction of THE ARCHITECTURAL FORUM, based on its annual survey and forecast which has just been completed, is that architects will be as busy, if not busier, in 1929 than in any preceding year. If any belief still persists that the record building activity in 1926 and 1927 represented a "boom period," it must be dispelled by the fact that the year 1928 shows a record of even a greater amount of construction than ever.

The theory was advanced by THE ARCHITECTURAL FORUM in January, 1928 that we had been experiencing a boom period in building activity, but that we had arrived at a relatively stable demand of new construction to meet the present-day needs of our growing population and expanded industrial and commercial life. In other words, the theory was advanced that we had practically arrived at a new normal annual volume of new building construction, from which deviations might occur only in direct accordance with the variations in general prosperity and business activity. The building figures of the year 1928, as shown in the accompanying charts, and in the totals produced by the various contract-reporting agencies, verify this theoretical conception. The reports of S. W. Straus & Company, covering permits issued and plans filed in 587 leading cities and towns throughout the country during the first eleven months of 1928, give a total value of $3,548,668,073, which is within approximately one million dollars of the total for the corresponding period of 1927. For the same period of eleven months, the F. W. Dodge Corporation reports building contracts in 37 states amounting to $6,195,529,800, which is slightly more than 6 per cent greater than the amount reported for the corresponding period of 1927 and that of the record-breaking year of 1926.

An additional and convincing proof of the theory of a new normal condition is presented in the accompanying forecast of THE ARCHITECTURAL FORUM for the year 1929. Architects throughout the country are familiar with the annual forecast which THE ARCHITECTURAL FORUM has presented for eight consecutive years, during which time it has arrived at a reasonably close approximation of the building activity which actu-

1929 PREDICTION BY DISTRICTS IN 19 BUILDING CLASSIFICATIONS

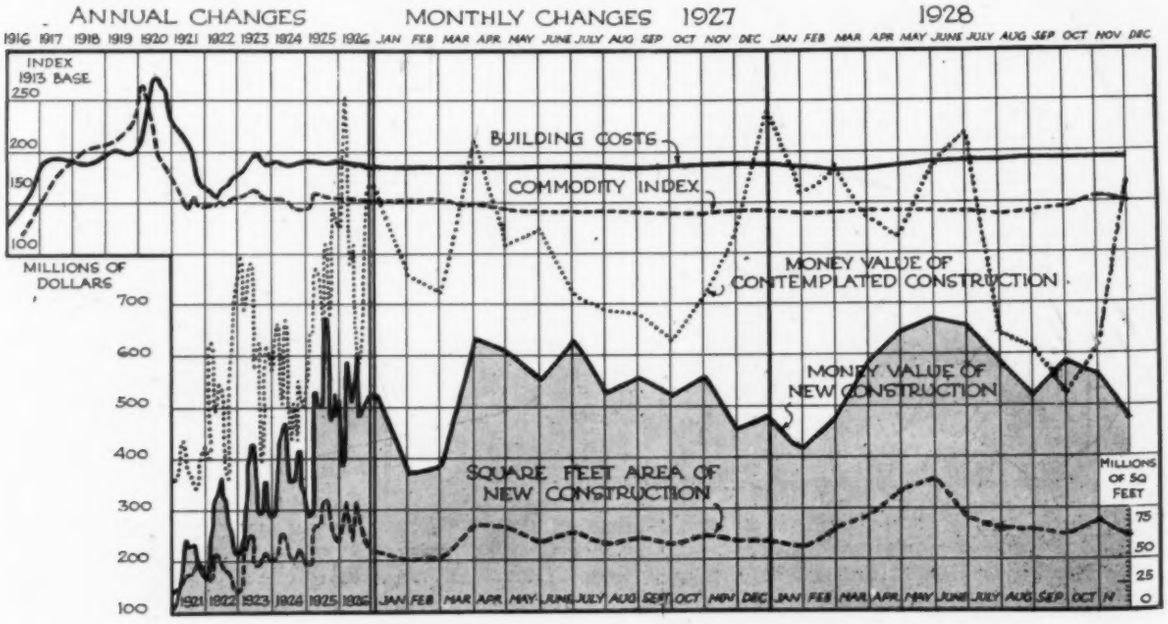
BUILDING TYPES	N. EASTERN STATES	N. ATLANTIC STATES	S. EASTERN STATES	S. WESTERN STATES	MIDDLE STATES	WESTERN STATES	U. S. A.
Automotive	$14,469,400	$42,132,200	$7,447,000	$10,670,000	$56,322,200	$14,539,800	$145,580,600
Banks	15,730,000	53,312,600	1,148,400	5,984,000	56,999,800	12,859,000	146,033,800
Apartments	16,801,400	366,163,600	10,469,800	20,882,400	171,941,000	84,992,600	671,250,800
Apartment Hotels	2,640,000	83,560,400	4,972,000	15,554,000	97,979,200	41,925,400	246,631,000
Club, Fraternal, etc.	7,231,400	70,010,600	1,515,800	13,191,200	66,704,000	15,987,400	174,640,400
Community and Memorial	3,421,000	21,232,200	1,529,000	5,711,200	17,047,800	11,710,600	60,651,800
Churches	21,142,000	55,105,600	22,770,000	23,859,000	69,885,200	20,409,400	213,171,200
Dwellings (Below $20,000)	10,936,200	83,540,600	6,791,400	11,215,600	40,198,400	24,314,400	176,996,600
Dwellings ($20,000 to $50,000)	10,346,600	38,445,000	5,935,600	7,629,600	37,470,400	15,085,400	114,912,600
Dwellings (Over $50,000)	6,749,600	43,443,400	5,555,000	5,662,800	25,348,400	12,837,000	99,596,200
Hotels	21,659,000	95,763,800	14,212,000	45,513,600	101,378,200	66,149,600	344,676,200
Hospitals	18,860,600	110,105,600	4,606,800	12,749,000	73,035,600	33,169,400	252,527,000
Industrial	20,295,000	130,191,600	15,661,800	35,846,800	154,671,000	28,789,200	385,455,400
Office Buildings	12,485,000	244,101,000	4,859,800	41,296,200	300,979,800	87,760,200	691,482,000
Public Buildings	15,518,800	185,924,200	6,226,000	18,499,800	87,353,200	27,689,200	341,211,200
Schools	44,811,800	165,499,400	13,010,800	60,152,400	256,326,400	57,981,000	597,781,800
Stores	6,366,800	78,876,600	4,477,000	7,926,600	55,497,200	23,324,400	176,468,600
Theaters (All Types)	6,303,000	62,891,400	3,746,600	7,812,200	74,032,200	8,773,600	163,559,000
Welfare Y. M. C. A., etc	10,799,800	48,100,800	5,077,600	13,666,400	31,858,200	4,644,200	114,147,000
TOTAL VALUE OF NEW BUILDINGS	$266,567,400	$1,978,400,600	$140,012,400	$363,822,800	$1,775,028,200	$592,941,800	$5,116,773,200

New Construction Under Architect's Supervision	$5,116,773,200
Buildings of All Types—Excluding Public Works and Utilities—Not Designed by Architects (Estimated from Averages of Previous Years)	2,192,020,000
TOTAL ESTIMATED CONSTRUCTION FOR 1929 (Exclusive of Public Works and Utilities)	$7,308,793,200

ally occurred. The forecast is based on individual reports received from architects in every part of the country, and the figures are developed by the use of a series of weighting factors which have been established after very careful research and which have proved to be substantially correct, insofar as anyone can forecast trends of the future. The present forecast for the year 1929 is based primarily upon reports received from 2,057 architectural offices, indicating work actually on the boards or in definite contemplation for contract letting during this year. The figures have been correlated and established in exactly the same manner which has proved successful for the seven preceding years, and for this reason it is felt that the law of average functions in these figures to a point which, unless some extraordinary occurrence takes place, will show that the figures given here for the year 1929 will be closely approximated in actuality. We predict, therefore, that building activity during the year 1929 will be maintained on approximately the same general level which has been established during the last three years, with a definite possibility of the total's exceeding any previous year's. There are definite changes in the relative activity in different types of buildings and there are changes in territorial activity, all of which are indicated in the accompanying tables and relative percentages.

In considering probable building activity it is, of course, necessary to give serious consideration to the general economic condition of the country. It is believed that we are entering a period of at least eight years of unprecedented prosperity. There are no threatening factors. There is no condition of over-expansion. There is a new administration in governmental affairs, which promises an even greater appreciation and understanding of the economic problems of the building industry than was ever before accorded. There has been established in the financial world a more direct relationship with the public, and consequently the sources from which money must be obtained for building projects are more powerful and more diversified than ever before. These coming years of prosperity will see another great development in the standards of housing for all types of commercial, industrial and domestic activity. Threads of transportation are drawing cities, suburbs and rural areas more closely together. There is a broader interchange of knowledge, and there is every reason to believe that higher standards and more rigid requirements will call for a volume of building which will maintain a new normal.

We are learning more about building activity in this country. The means for gathering figures are constantly being improved, and as a result, we are gradually realizing that our measuring of building activity has been inadequate in the past, and that in actuality we are building well over eight billion dollars' worth of new structures annually, to which may be added repair and replacement bills to bring the total closer to ten billion dollars, making the building industry by far the greatest of the basic industries of this country. This is the day of the architect in a manner never before known. He is constantly becoming more important in the economic structure, because he is



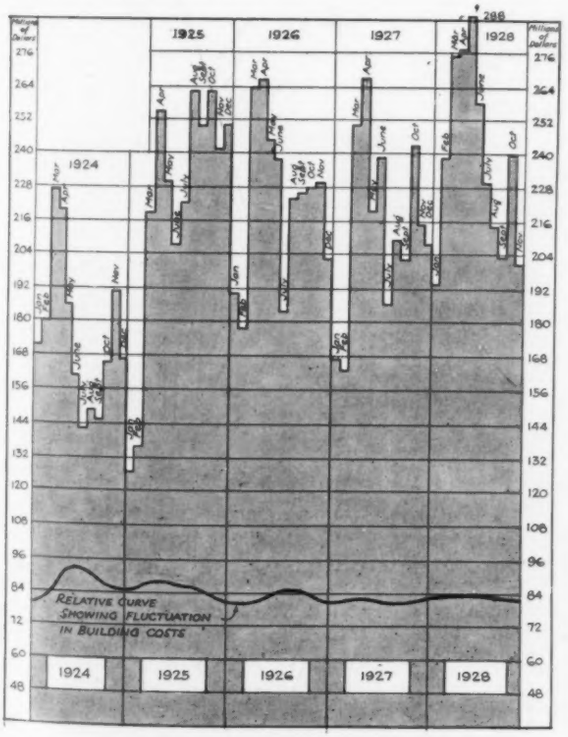
THE BUILDING SITUATION

The various index lines are designated on the chart, which is developed from reports of the United States Department of Commerce, the F. W. Dodge Corporation, and *The Engineering News-Record*

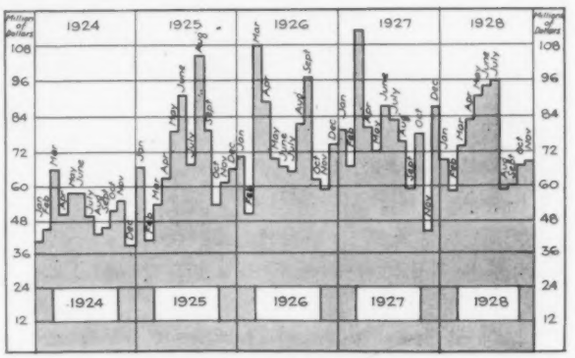
accepting the responsibilities of planning efficiently and of creating structures which are economically sound and successful as investment projects, as well as interpreting æsthetic features. The application of architectural precedents, as indicated by the work of contemporary American designers, comes closer to original conception than in any period known since these very precedents were established. Architects may, therefore, look forward with confidence to a busy year, a year which should be prosperous perhaps in a manner never known before by the architectural profession.

NATIONAL PERCENTAGES, U. S. A.

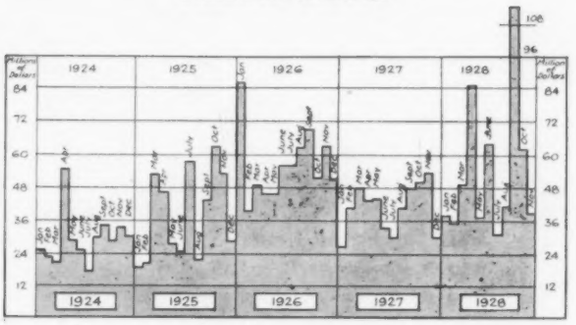
Type of Building	*Requirements for New Buildings by Percentages*		
	1928	*1929*	*Change*
Automotive	3.9	2.8	—1.1
Banks	2.8	2.9	+ .1
Apartments	13.2	13.1	— .1
Apartment Hotels	4.4	4.8	+ .4
Clubs, Fraternal, etc.	3.5	3.4	— .1
Community, Memorial	1.5	1.2	— .3
Churches	4.3	4.2	— .1
Dwellings (under $20,000)	4.0	3.6	— .4
Dwellings ($20,000 to $50,000)	3.3	2.3	—1.0
Dwellings (over $50,000)	2.4	1.9	— .5
Hotels	6.9	6.7	— .2
Hospitals	6.2	4.9	—1.3
Industrial	5.3	7.5	+2.2
Office Buildings	11.8	13.5	+1.7
Public Buildings	6.7	6.7	—
Schools	11.5	11.7	+ .2
Stores	2.9	3.4	+ .5
Theaters	3.3	3.2	— .1
Welfare, Y.M.C.A., etc.	2.1	2.2	+ .1



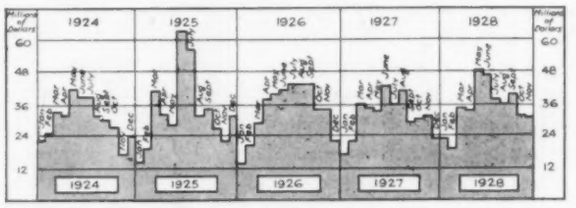
Residential Buildings



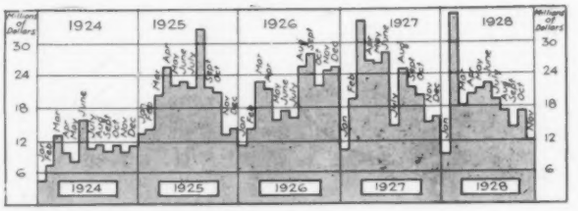
Commercial Buildings



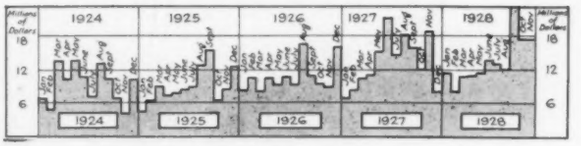
Industrial Buildings



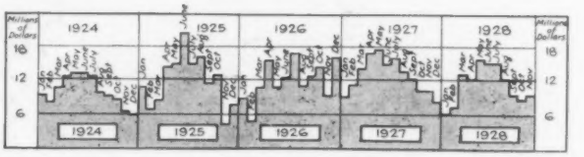
School and College Buildings



Club and Fraternal Buildings



Hospitals and Institutions



Church Buildings

CHARTS SHOWING VALUE OF NEW CONSTRUCTION FOR PAST FIVE YEARS

NORTH ATLANTIC STATES

Type of Building	Requirements for New Buildings by Percentages		
	1928	1929	Change
Automotive	3.9	2.1	—1.8
Banks	4.2	2.7	—1.5
Apartments	20.0	18.5	—1.5
Apartment Hotels	.2	1.0	+ .8
Clubs, Fraternal, etc.	2.6	3.5	+ .9
Community, Memorial	.8	1.1	+ .3
Churches	2.9	2.8	— .1
Dwelling (under $20,000)	4.4	4.2	— .2
Dwellings ($20,000 to $50,000)	4.0	2.0	+2.0
Dwellings (over $50,000)	2.6	2.2	— .4
Hotels	6.2	4.8	—1.4
Hospitals	6.0	5.6	— .4
Industrial	4.6	6.6	+2.0
Office Buildings	8.0	12.3	+4.3
Public Buildings	7.1	9.4	+2.3
Schools	11.4	8.4	—3.0
Stores	3.1	4.0	+ .9
Theaters	2.5	3.2	+ .7
Welfare, Y.M.C.A., etc.	2.4	2.4	—

SOUTHWESTERN STATES

Type of Building	Requirements for New Buildings by Percentages		
	1928	1929	Change
Automotive	4.8	2.9	—1.9
Banks	2.8	1.6	—1.2
Apartments	6.2	5.7	— .5
Apartment Hotels	3.6	4.3	+ .7
Clubs, Fraternal, etc.	4.1	3.6	— .5
Community, Memorial	1.5	1.6	+ .1
Churches	5.8	6.6	+ .8
Dwellings (under $20,000)	4.5	3.1	—1.4
Dwellings ($20,000 to $50,000)	3.4	2.1	—1.3
Dwellings (over $50,000)	3.1	1.6	—1.5
Hotels	12.5	12.5	—
Hospitals	5.9	3.5	—2.4
Industrial	3.4	9.8	+6.4
Office Buildings	15.9	11.4	—4.5
Public Buildings	4.9	5.1	+ .2
Schools	12.8	16.5	+3.7
Stores	2.2	2.2	—
Theaters	1.0	2.1	+1.1
Welfare, Y.M.C.A., etc.	1.6	3.8	+2.2

NORTHEASTERN STATES

Type of Building	Requirements for New Buildings by Percentages		
	1928	1929	Change
Automotive	5.4	5.4	—
Banks	3.4	5.9	+2.5
Apartments	3.3	6.3	+3.0
Apartment Hotels	.2	1.0	+ .8
Clubs, Fraternal, etc.	3.4	2.7	— .7
Community, Memorial	1.0	1.3	+ .3
Churches	6.4	7.9	+1.5
Dwellings (under $20,000)	6.4	4.1	—2.3
Dwellings ($20,000 to $50,000)	3.7	3.9	+ .2
Dwellings (over $50,000)	2.8	2.5	— .3
Hotels	6.9	8.1	+1.2
Hospitals	7.3	7.1	— .2
Industrial	5.8	7.6	+1.8
Office Buildings	8.5	4.7	—3.8
Public Buildings	7.8	5.8	—2.0
Schools	13.6	16.8	+3.2
Stores	3.8	2.4	—1.4
Theaters	7.	2.4	—4.6
Welfare, Y.M.C.A., etc.	3.3	4.1	+ .8

MIDDLE STATES

Type of Building	Requirements for New Buildings by Percentages		
	1928	1929	Change
Automotive	3.8	3.2	— .6
Banks	1.9	3.2	+1.2
Apartments	10.6	9.7	— .9
Apartment Hotels	6.0	5.5	— .9
Clubs, Fraternal, etc.	4.9	3.8	—1.1
Community, Memorial	2.4	1.0	—1.4
Churches	4.1	3.9	— .2
Dwellings (under $20,000)	2.8	2.3	— .5
Dwellings ($20,000 to $50,000)	2.1	2.1	—
Dwellings (over $50,000)	1.8	1.4	— .4
Hotels	6.0	5.7	— .3
Hospitals	6.3	4.1	—2.2
Industrial	6.9	8.7	+1.8
Office Buildings	15.0	17.0	+2.0
Public Buildings	7.5	4.9	—2.6
Schools	9.3	14.4	+5.1
Stores	2.3	3.1	+ .8
Theaters	4.1	4.2	+ .1
Welfare, Y.M.C.A., etc.	2.2	1.8	— .4

SOUTHEASTERN STATES

Type of Building	Requirements for New Buildings by Percentages		
	1928	1929	Change
Automotive	4.8	5.3	+ .5
Banks	1.3	.8	— .5
Apartments	8.2	7.5	— .7
Apartment Hotels	2.9	3.6	+ .7
Clubs, Fraternal, etc.	1.7	1.1	— .6
Community, Memorial	.3	1.1	+ .8
Churches	7.4	16.3	+8.9
Dwellings (under $20,000)	5.1	4.8	— .3
Dwellings ($20,000 to $50,000)	4.7	4.2	— .5
Dwellings (over $50,000)	4.0	4.0	—
Hotels	11.7	10.1	—1.6
Hospitals	5.1	3.3	—1.8
Industrial	4.2	11.2	+7.0
Office Buildings	5.8	3.5	—2.3
Public Buildings	2.9	4.4	+1.5
Schools	21.6	9.3	—12.3
Stores	3.0	3.2	+ .2
Theaters	2.5	2.7	+ .2
Welfare, Y.M.C.A., etc.	2.8	3.6	+ .8

WESTERN STATES

Type of Building	Requirements for New Buildings by Percentages		
	1928	1929	Change
Automotive	3.0	2.4	— .6
Banks	1.2	2.2	+1.0
Apartments	11.7	14.3	+2.6
Apartment Hotels	5.9	7.1	+1.2
Clubs, Fraternal, etc.	2.3	2.7	+ .4
Community, Memorial	1.7	1.9	+ .2
Churches	6.1	3.4	+2.7
Dwellings (under $20,000)	4.3	4.1	— .2
Dwellings ($20,000 to $50,000)	4.0	2.5	—1.5
Dwellings (over $50,000)	2.7	2.2	— .5
Hotels	6.9	11.2	+4.3
Hospitals	6.3	5.6	— .7
Industrial	3.7	4.9	+1.2
Office Buildings	14.2	14.8	+ .6
Public Buildings	4.7	4.7	—
Schools	13.3	9.8	—3.5
Stores	4.1	3.9	— .2
Theaters	2.8	1.5	—1.3
Welfare, Y.M.C.A., etc.	1.0	.8	— .2

COMPARISON OF DEMANDS FOR NEW BUILDINGS IN 1928 AND 1929, BY DISTRICTS

CRAFTSMANSHIP

BY

WILLIAM O. LUDLOW

CHAIRMAN OF THE COMMITTEE ON RECOGNITION OF CRAFTSMANSHIP, NEW YORK BUILDING CONGRESS

THE Plasterer: "I have been at my trade for 40 years, and have been accustomed to the best work in New York. I do 100 per cent work if possible, and have monuments of my work throughout the city. I think the craftsmanship certificates help the spread of good craftsmanship. The buttons and certificates are the finest things in life."

Painter: "Everyone tries to get one. In the last few years I have had more time to do the work and do it right. Finest piece of plaster work in city done by Mr. Jones on the Seamen's Bank for Savings. It is a pleasure for a painter to work on that kind of work. The plasterers help the painters out."

Hoisting Engineer: "I feel highly honored by receiving the certificate, and the Missus feels that way also."

Architectural Carver and Sculptor: "One of the greatest things ever brought up; wonder it hasn't been taken up before. I am proud of my work."

Such are some of the comments made by workmen who have received from the New York Building Congress certificates and gold buttons for superior craftsmanship. Effort, time and money have been expended over a period of nearly four years, not merely to reward certain deserving workmen, but in an endeavor to raise the whole standard of workmanship in the building industry. We well know that higher wages, stricter supervision, and driving the men will not bring better quality; we must move their desires, awaken their pride, instill ideals. This whole movement of the recognition of craftsmanship, therefore, is an attempt to preach far and wide the gospel of quality work, and the 950 certificates of honor that have been presented to mechanics in New York are one of the means. It is of more than passing interest to inquire, therefore, if substantial results have been accomplished. Is better work being done, and has the spirit of the men been stimulated?

The comments of the honored craftsmen, themselves, such as have been quoted, tell us something. The opinions of some of New York's most prominent builders are also enlightening. I quote a few.

J. R. Kilpatrick, Vice-president of George A. Fuller Co.: "It is impossible to measure the concrete results of the recognition of the craftsmanship movement, but they have been remarkable in rehabilitating pride in craftsmanship. Undoubtedly the results of this work show in better quality of workmanship. The attitude of the men is improved."

Presentation of Certificates of Craftsmanship, Upperen Cadillac Building, New York

Craftsmen Receiving Certificates at the Bank of New York and Trust Company

William O. Ludlow presenting certificates; Edwin J. Merrill, President of the Board of the Bank; Benjamin Wistar Morris, Architect, and Robert Eidlitz, Builder, are present

D. T. Webster, of the firm of Marc Eidlitz & Sons: "It has created a spirit of emulation,—workers are talking about better craftsmanship,—they are thinking about it. They now have a target to shoot at,—something to strive for. The results cannot be measured, and if they could, it would not be advisable to do so."

John Lowry, of John Lowry, Inc.: "More enthusiasm is put into their work. The men have a desire to do better work and are stimulated by the awards. There is a better spirit created by the awards, and no doubt about it."

Christian G. Norman, Chairman of the Board of Governors of the New York Building Trades Employers' Association: "The building industry generally is looking forward in its line of progress to doing things better, and the incentive for the workman not only to draw a substantial wage but to be proud of what he is doing should be properly instilled. My reaction to the craftsmanship movement of the Building Congress is that it is being talked about to a considerable extent among the workmen, and anything that makes for better quality work should be encouraged."

And what has labor itself to say? John Halkett, President of the New York Building Trades Council, in speaking to a group of honor craftsmen, remarked: "You are a credit and an honor to the Building Trades Council. You must encourage and inspire others who have thus far failed to obtain recognition. The New York Building Congress has exerted great influence in New York, and there has been harmony during this period between employer and employe."

John J. Collins, Secretary-Treasurer, International Union of Tunnel & Subway Constructors of North America, says: "Labor heartily joins in doing its share to encourage better workmanship. It sees a great value to all concerned, including the public. Public recognition, with its accompanying certificate and gold button is a reward that brings real satisfaction to the worker and an incentive to his fellow workers. I see an increasing eagerness on the part of the workers to measure up to the title of 'Craftsman.'"

Alexander Kelso, Secretary-Treasurer of the Carpenters' District Council says: "One of the achievements of the New York Building Congress is the recognition of the craftsman who has shown outstanding workmanship in his trade. It is something new for the mechanic to be so honored. We have all seen tablets at the entrances of buildings on which are inscribed the names of the engineer, architect, contractor and banker as men

The Chairman Presenting Craftsmanship Certificates, New York Life Insurance Building
Darwin P. Kingsley, President, New York Life Insurance Company. in center

who have erected the structures. We have to thank the New York Building Congress through its Committtee on Recognition of Craftsmanship for giving the workman his delayed recognition."

Comments such as these seem to indicate that the program of the awarding of certificates is not only meeting with general approval but that it has had a far-reaching result. We know at least that the 950 men who have been honored have a new attitude toward their work, have received a new inspiration, and a new incentive. Perhaps it is safe to say also that a large proportion of the thousands of workmen who have witnessed the presentation of the certificates to these 950 men have had their ambition stirred, pride in craftsmanship awakened, and now realize that "someone cares." Moreover, the hundreds of articles, news items and editorials that have been carried by all of the leading papers, the radio broadcasting and the magazine articles that have a countrywide circulation have had influence, it is fair to presume,—perhaps intangible, but nevertheless real, definite and enduring.

For the stirring of the spirit of pride of craftsmanship there never was a time more opportune than these years of prosperity, and perhaps there never has been a body of workmen who by reason of their general intelligence were more ready to be convinced that there is nothing more satisfying in life than work well done. We have started with our work of recognition of craftsmen in New York in the building trades, but suppose that this kind of recognition spreads further? Suppose it spreads to other industries and other occupations and to other cities? I believe it is possible that there may be awakened throughout our land a will to do good work, an appreciation of the spiritual value of craftsmanship and the happiness it brings, and that there may be stirred in many workers a new and mighty ambition. Then we shall have done our part in reviving the interest in superior craftsmanship that we so sorely need, and then we shall have done our part in bringing into the lives of some men a new usefulness and a new contentment. Perhaps then we shall have done our part, too, toward bringing to the American people a new and a worthier citizenship.

Editor's Note. Mr. Ludlow will explain in a second article the way in which the New York Building Congress has organized and conducted its activities in the recognition of craftsmanship.

WHAT IS A GOOD CRAFTSMAN?

The following definition was part of a talk given by William O. Ludlow, Chairman of the Committee on Recognition of Craftsmanship, to a meeting of Honorary Craftsmen members of The New York Building Congress in Carpenters' and Joiners' Hall, Madison Avenue, New York, December 7, 1927

A GOOD CRAFTSMAN first of all is a man who does first class work in his trade; he is known by his workmanship; nothing he does is shoddy, ugly or of poor quality.

"A good craftsman is loyal. He is loyal to his union, for he believes that no union man has any right to injure either his union or anyone in it, and he believes that any man who belongs to a club or a society or a union is bound to help that organization along in any way he can.

"A good craftsman is loyal to the men of other trades. He never intentionally or willfully injures the work of another workman. If he is a carpenter, he doesn't draw pictures on white plaster walls, and if he is a plasterer, he doesn't drop mortar on a newly laid floor.

"A good craftsman is loyal, also, to his employer and the owner, for he knows that he has sold to them his eight hours a day and his skill, and he would no more expect to loaf on the job or do poor quality work than he would expect his grocer to take his money for a barrel of potatoes and then give him the barrel half full, or the potatoes half rotten.

"A good craftsman realizes that buildings are produced by coöperation,—coöperation all the way down the line from the owner to the laborer,—and he rightly feels that his part in the construction of a building is just as necessary and just as important as the architect's or the contractor's part; he is proud to point out the buildings he has had a hand in building.

"A good craftsman, moreover, never forgets to give a word of advice or encouragement to the apprentice or show him how to do a job. He is quick to help his brother mechanic when he needs a hand, and he is the first man to pick up the fellow who meets with an accident. He is never a grouch, and when he is about, things seem to go better on the job.

"And then a good craftsman is a man with a happy look on his face. Why shouldn't he have a happy look? His day's work is no mere grinding out so many hours for so many dollars; he has given to his work the most precious things he has,—his interest, his skill, his best effort. Every day when he quits, he looks over his work with pride and satisfaction for he knows he has done a good job, and he brings home to his wife and 'kiddies' contentment and happiness. Because he is a good craftsman, he is a good fellow, a good husband and a good father, a worthwhile man in his community,—a good citizen.

"Now you and I do not know whether the years ahead of us are few or many, but some day perhaps we shall stand before the Great Craftsman Who made all things, and perhaps we shall be asked 'What have you done?' I think the good craftsman will answer: 'I did the best work I knew how.'"

THE CLIENT, THE ARCHITECT AND THE CONTRACTOR

PART II—THE ARCHITECT

BY

CLINTON H. BLAKE

IN referring in my preceding article, in the November issue of THE ARCHITECTURAL FORUM, to the attitude of the owner, I pointed out that in most cases the owner has either a very poor opinion of architects in general or an unreasonably exalted view of the profession. While the converse of this is not entirely true, it is true that the architect, as a rule, considers that the client is either wholly lacking in building and design sense and knowledge, or else that he has a very general and more or less complete knowledge of building customs and problems and understands all the essentials of architectural practice and the customs of the architectural profession. It would be perhaps a trifle more accurate to say that ordinarily the architect holds a point of view which is a composite of these two ideas. He is, I am afraid, rather scornful on the whole of the layman's knowledge of buildings and their construction and plan, but on the other hand, although it may be paradoxical so to do, he assumes too often that the layman has a rather full understanding of the practices and customs of architects. The architect is likely to prove wrong on each of these points. While many clients are wholly helpless in the face of a sketch or plan drawings, and are more or less paralyzed at the sight of specifications, there are many who have the ability intelligently to read sketches or plans, to visualize the finished work, and to analyze and constructively criticize the proposed specifications.

Where the owner is equipped with a fair amount of common sense and knows what he wants and can analyze and make clear his requirements, his coöperation may be of very great value. I have known repeated instances, however, where the architect, having to deal with an owner of this character, has nevertheless proceeded on the theory that the owner was a very minor element in the transaction; that his chief function was to pay bills and ultimately enjoy the fruits of the architect's and contractor's labor, and that it would be a waste of time to seek his coöperation in so far as any practical advice relating to the work was concerned. I know of many cases where a much better result would have been secured and a great deal of difficulty for all concerned avoided, if the architect had given the owner an opportunity to discuss some of the problems involved and had been content to heed some of the advice which the owner volunteered.

The fact that one is an able business man does not, it is true, necessarily qualify him as a critic in design or construction. On the other hand, there is much of common sense in the practice of every profession, and the advice and help of an intelligent and common-sense client is not to be despised. No one can sympathize more heartily than I with the difficulties which architects encounter in dealing with clients who are not qualified to advise but who, apparently for that particular reason, consider themselves qualified to do so. I would emphasize merely the thought that, while there are clients of this character, there are others who can be of real help to their architectural advisers. Even if their advice is not taken, a little tactful discussion with them now and again, which gives to them the thought that their ideas are being considered and made use of, will yield good diplomatic results. On the other hand, the architect cannot, in justice either to himself or to his client, assume, as is so often assumed, that the client is acquainted with architectural customs and practices. In this connection, I have in mind especially the matter of the ownership of plans, the matter of extras and supervision, changes in the plans and the like. The architect owes it to both the client and to himself to make these points clear to the client, so that the latter may understand the basis on which they are proceeding, the possibilities of additional cost, the scope of and limitations upon the architect's services, and similar points entering into their relationship and into the operation.

I have had occasion many times to point out to the profession the prevalent misconception on the part of architects of the law with respect to the ownership of plans. As I have indicated time and again, the ownership of the plans, as a legal proposition, in the absence of a contract to the contrary, is vested in the client who has ordered and paid for them. This is far better understood by architects than it was a few years ago. Nevertheless, in repeated instances, architects are still proceeding under the comfortable delusion that, because it is the custom of the profession that the plans as instruments of service belong to the architect, the client must recognize the fact that this is so. A client is not necessarily presumed to be acquainted with the customs of the architectural profession. He is not necessarily bound by any such customs, where he has no knowledge of them and they have not been brought to his attention or been impliedly made a part of his understanding with the architect. A special custom, as a matter of fact, is one of the weakest reeds upon which legal rights can be predicated.

If it can be shown that the client was acquainted

with the custom and made no objections to it, proof might be admitted and the custom sustained. For example, if the client had dealt with the architect previously and knew that it was the architect's custom to assert ownership to the plans or to charge, in the absence of agreement, a certain rate, the client would be held, in further dealings with the architect, to be in effect placed on notice and, in the absence of a definite agreement, to be willing impliedly to go ahead on the same basis as that on which they had formerly dealt. It is such a simple matter, however, to cover such a question as to the ownership of the plans by specific agreement, that any architect is foolish to trust to proof of custom or to an implied understanding with the client on this point. The chances are decidedly against his being successful, unless he can show a specific agreement, and it has become clearly manifest that the tendency of the courts is opposed to sustaining the architect's ownership of the plans on the basis of custom rather than specific agreement. To protect his right to the ownership of plans, therefore, the only commonsense and safe course for the architect to follow is to have a definite agreement with the client on this point by which the ownership by the architect of the plans is clearly covered and recognized.

The architect is somewhat likely, also, to assume that the client realizes the expense involved in the preparation of plans and specifications and especially in the carrying out of successive changes in the drawings. The client has a very limited understanding of these things. As I said in discussing his point of view, he has no conception, ordinarily, of the time involved in producing drawings and details. He is more impressed by the specifications, because they appeal to him as a business contract and he can see from examining them that they involve considerable care and effort. The drawings do not produce in him any such reaction. It seems to him a simple matter to make changes and to make still further changes. He looks upon these as more or less routine matters which can be easily carried into effect by the architect and which do not involve real time or expense. He realizes in a very limited way, if at all, the amount of time that must be given to a study of the whole problem as it is affected by the changes which he requests or of the expense for draftsmen and for service which these changes will mean to the architect. He has little conception, also, of the expense which changes will mean to him personally, in additional extra charges by the contractor. When these charges come in, he will be both astonished and angry in many cases, and often the nearest target at which his displeasure can be aimed under these conditions is obviously the architect.

One of the chief problems connected with this question of changes in the plans is how fairly to recompense the architect for his extra work. The Institute form of contract properly provides fo extra payments to the architect for changes in the scheme originally adopted. The practice of architects in the application of this principle varies widely. Generally speaking, in practices of a more commercial character the architect is inclined to stress the point very little and to make any changes within reason without any material increase in compensation. Other architects, especially in residential work, stand strictly on their rights and expect and collect additional compensation for any material changes.

The handling of this matter with the client requires considerable tact and diplomacy. It is necessary that each client be approached in a particular way and each case handled on its own merits. The important fundamental fact, however, is that the architect, if he intends to seek additional compensation for changes ordered by the client, can in large measure prevent misunderstandings and ill feeling, if not more serious complications, by making clear to the client in the first instance the fact that the architect will expect and is to receive extra payment, if changes in the plans as prepared and at first approved are made. In some cases, this compensation will amount to a modest sum; in others, it may involve the re-drafting virtually of all the plans and a restudy of the whole problem. In this case, the architect will legally and morally be entitled to substantially a new fee in addition to that already earned. From my talks with clients as well as with architects, I know that the client ordinarily does not understand a request for additional payments by the architect for changes in the plans. He resents such a request and feels that it is unfair, unless he has been prepared for it in the first instance and unless the circumstances which make it proper and equitable have been explained to him. It is not a difficult matter for the architect to bring home to the owner tactfully and without over-emphasizing it, but nevertheless clearly, a true understanding of these points. He can make clear to him something of the work and expense which changes in the plans involve from the point of view of the architect, and he can warn him against extras and against making changes which will inevitably result in extras. By putting the owner on notice in these respects, he will be doing him a real favor, and he will be doing himself a great service at the same time.

One of the most dangerous and yet most common points of misapprehension on the part of the architect has to do with his position as agent for the client. He assumes all too often that his appointment as architect carries with it a general agency and authority to do whatever he thinks

necessary within rather wide limits in connection with the building operation. If he has an agreement with the client which gives him power to make changes and act in general in the client's behalf, he is protected in doing so. It is a very exceptional case, however, where any such general agency is granted. The standard form of contract and the contracts ordinarily in use throughout the profession give to the architect very limited agency powers and discretion. The recent amendment to the Institute's form of contract, providing that the architect may make minor changes in the work, not involving extra cost and not inconsistent with the purpose of the building, is a step in the right direction. I am afraid that most architects, however, feel that they have the right, irrespective of any contract, not only to make such minor changes, but also to make, without the authority of the owner, changes in many particulars which involve various extra charges.

The architect will do well to disabuse himself of any such delusion. The only safe course for him to follow is to adhere strictly to the specific authority given to him and, where he wishes to depart from it, to secure the approval and clear authorization of the client. Any other course will inevitably result, not only in misunderstandings between the client and himself and between the client and the contractor, but will lead in many instances to his being held liable for the additional cost to the client of alterations and changes put into effect without the latter's approval.

The agency of the architect may be what is known in the law as an "express" agency, or it may be an "implied" agency. An express agency is one granted in express terms. If the owner in so many words gives the architect the right to make specified changes in the plans or specifications or to deal in certain specified ways with the contractor or others, this constitutes such an express agency. On the other hand, an implied agency is one which has not been expressly granted, but which is legally assumed to result from certain acts of the principal or the surrounding circumstances. Obviously, an implied agency is a rather dangerous proposition. No agent can safely proceed on the basis of an implied agency only. An architect, especially, cannot do this. If he limits his acts to authority which has been given expressly, and if he secures this authority in writing, he cannot well go wrong.

Many architects assume that they have authority to act when, in fact, in the eyes of the law they have no such authority. In some cases they assume that they have the authority, simply because they are acting as architects. In some instances they assume they have it as the result of something which has been said or done by the owner. If the owner should say to the architect, for example: "I cannot be bothered with changes in the work,—please attend to them," many an architect would, with considerable show of reason, construe this as giving him full power to handle any changes which may be involved. The owner, on the other hand, by this remark, may have in mind simply routine changes, involving no substantial additional outlay, if any, and not changes involving substantial extras or varying in any material respect from the plans or specifications. The architect should not, in his own interests and in the interests of a proper understanding with his client, indulge in any assumptions when this matter of agency is involved. It is a simple matter for him to secure the specific approval and authority of the client where this is required, and he will be far wiser to assume too little rather than too much authority.

There is another phase of the architect's activities, however, in which he can assume responsibility without the danger of laying himself open to criticism or claims for damages. This phase has to do, not with his agency powers, but with his general advisory powers. One of the most common criticisms of architects which I have heard from clients is that the architect considers that he has done his full duty when he prepares the plans and specifications and supervises construction. There are many ways in which he can render much appreciated service to the client beyond the strict limits of his employment. In advising the client, in giving him a somewhat broader service than usual, in general advice and attention, in suggesting to him certain danger points which he should have in mind, in making clear to him the status of the contractor and the like,—in all these ways, he can both aid the client and build up with the client good will which will be of real value in the future as well as in the present. The client, as a business man, appreciates his architect's making suggestions which safeguard the client on the business phases of the operation. What I have in mind can perhaps best be summed up in the word "service." The service given the client by the architect may go far beyond the limits of the legal duties of the architect strictly construed. It will cost the architect something more to give this service, but the increased good will of his clients which will result from it will be substantial dividends.

When it comes to making estimates and dealing with cost figures, many architects are inclined to proceed far too casually. This is perhaps one of the most serious points of controversy in many cases between the architect and the client. It holds, also, probably, more of real danger for the architect than any other phase of his activities. The architect assumes too often that, when he gives to the client a cost estimate, the client ac-

cepts it with the understanding that the architect is merely making his best guess and that the figure is wholly tentative. The client, as I have pointed out in the preceding paper of this series, does not, however, accept an estimate in this spirit or upon this understanding. He is far more likely to accept it as an estimate given by an expert who by training and knowledge is in a position to give accurate figures. When it develops that the cost of the work far exceeds the amount of the estimate, he will in some cases feel that he has been "led on" by the architect, and in other cases he will feel that the architect is incompetent. Either feeling may be and probably will be under these conditions unjust to the architect. The client's point of view as to this, however, results usually from the fact that the architect has not made clear to him his limitations as a prophet of cost.

It is not a difficult matter for the architect to make clear to the client who is at all reasonable the fact that cost figures are today so variable that no one, however expert he may be in the profession or in the building game, can prophesy with accuracy. He can point out to the client that he is giving his estimates for what they are worth, and for nothing more. If the client insists on a more definite commitment, the architect can refuse to give the estimate or, if he feels that he must give it in order to hold the client's favor, he can at least discount increases in building costs with sufficient liberality so that the figure which he gives will be high rather than low. The client is naturally interested in the cost of the work. It is natural, also, that he should feel that the architect is in a position to give him that cost with substantial accuracy. The architect should see to it that he is set straight as to this and that any estimates given are so framed that they do not by any chance amount to definite cost representations or guarantees.

Differences and misunderstandings between the architect and the client are being materially lessened in number by the increased use of written contracts between them. Much missionary work in this field remains to be done, however. There are still many architects who feel that the use of a written contract with a client is impractical, and there are even those who maintain that it is in some way unethical. I had quite a spirited argument with one of the latter group not long ago. His position was that he would cheapen in some way his professional status if he requested his client to sign a written contract, and that by so doing he would become in effect a business man rather than a professional man. I do not think that there are many architects who hold this view. There are, however, a great many who feel that to ask the client to enter into a contract will create a bad impression and may result in the architect's losing the commission. This feeling is based, I am convinced, on a misconception of the attitude of the ordinary client. The latter does not object to the architect's desire that the dealings between them be reduced to a concrete and written understanding. On the contrary, he welcomes such a suggestion, both because it is in line with sound business and the methods which he himself would adopt in business dealings, and because, also, it confirms him in his feeling that he has secured the services of an architect who is practical and businesslike. The client wishes to feel that he has secured the services of one who has real artistic ability. He is just as keenly interested, however, in feeling that he has secured the services of one who is practical and in touch with business methods and needs. Now and again it is quite possible that a client will be encountered who is not willing to sign a contract and who may resent being asked to do so. Any unpleasantness resulting from these isolated cases, however, will be more than compensated for by the favorable impression created in the minds of other clients by the evident desire and determination of the architect to deal with matters on a business basis.

So far as the attitude of the architect and contractor is concerned, it is my experience that it is on the whole one of understanding, coöperation and fairness. Some architects undoubtedly view the contractor as one to whom they have no obligation, and consider that they are justified in acting as the advocate of the owner alone. The great majority, however, realize that they owe an obligation to the contractor, as well as to the owner; that while they are employed by the owner and must act primarily in his interest, they are not expected to take any action which is unjust or unfair to the contractor; that where they are called upon in effect to arbitrate between the two parties especially, and to make more or less judicial decisions as between them, they must act with fairness to both and with impartiality.

The contractor has just as much right to expect fair treatment at the hands of the architect as the client has to expect it. Confidence on the part of the contractor that he will receive fair treatment is a mighty valuable asset in any building operation. If the contractor is assured of this fact, he will very readily place himself on many points in the hands of the architect, where otherwise he would refuse to do so; he will defer to the decisions of the architect, without complaint, and will in general coöperate in securing the prompt and satisfactory completion of the work, where he would fail to do this if he felt that the architect would not stand behind him on any issue where right is on his side. The existence of such cordial understanding and confidence between architect and contractor is to the owner's interest.

BETTER STUCCO HOUSES

PART III

BY

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ON September 16, 1928 a hurricane, the maximum velocity of which was conservatively estimated at more than 100 miles per hour, again swept over parts of Florida, teaching to builders by the types of its devastation precisely the same lessons about building construction that were taught by a similar hurricane just two years previously. The lessons of the disaster in 1926 were well taught, but they were not heeded, either because of willful disregard by unscrupulous builders or because of the well known American inclination to take a long chance. In either case the result was the same; preventable damage running into many millions of dollars occurred.

It will be very instructive to review a typical sequence of events during such a gale and suggest, as the narrative proceeds, feasible remedies for certain weaknesses which experience has revealed in the construction of this type of building. The problems involved in the foundation and in the framing up to the roof line were discussed by the writer in articles which appeared in the August and November issues of THE ARCHITECTURAL FORUM. The present article deals with the subjects of roof framing and coverings for hurricane regions, and with chimney design for localities that are visited by severe earthquakes.

Roof Coverings. This is a very difficult problem when the roof is of the gable type. Practically every kind of covering has been ripped off by strong hurricanes,—the various kinds of tile, slate, sheet metal, sheet composition, composition shingles, metal shingles, asbestos-cement shingles, and wooden shingles. The wooden shingle seems to have the best record for staying on, but wooden shingles should not always be used because of the great fire hazard they present. However, a valuable conclusion may be drawn from the superior behavior of the wooden shingle. The writer believes that this superiority is due to the fact that only about 30 per cent of its surface is exposed to the wind; this permits the nails to be placed low, which, in conjunction with the stiffness of the wood, renders the shingle very resistant to uplift. On the other hand, nearly all the types of metal shingles on the market,—they are made in aluminum, copper and zinc,—and also the asbestos-cement shingles, have very little overlap compared to their exposed surface area, with the result that when a strong wind gets under these metal shingles, they may be uplifted like hinged trap doors. In addition, some manufactured shingles are brittle and tend to crack at the nail holes. This is particularly true of those laid in hexagonal fashion, where the overlap is very small.

The writer believes that both the non-ferrous metal and the asbestos-cement shingles would prove satisfactory in hurricanes if the overlap from above were arranged by the manufacturer to be about 65 per cent. The exposed surface should not exceed about 8 inches in width by 6 inches. While such a large overlap would practically double the cost of the covering, its hurricane resistance would insure permanence that would mean much greater ultimate economy, because the damage by water to the interior of a house is likely to be very great after a storm has destroyed the roof. Furthermore, the metal shingles could be stiffened by pressed longitudinal ribs and edge flanges so shaped that the exposed edges would lie flat against the shingles below, and thus prevent the wind from wedging in between. Asbestos-cement shingles might be made thicker to strengthen them for the abnormal strains. They could be moulded wedge-shaped like wooden shingles so that, when nailed, they would lie flat, because the wind must not be allowed to get under any part of the roof covering. Asbestos-cement shingles would then be preferable along ocean shores where the atmosphere is very corrosive on metal shingles because of its high content of wind-blown salt water globules. In other regions, in order to reduce corrosion to a minimum, copper nails could always be used with copper shingles, and heavily galvanized steel nails with either zinc or aluminum shingles. If, for example, copper nails are used with either zinc or aluminum shingles, the electrolytic action that produces corrosion is intensified; this will greatly reduce the otherwise long life of these shingles. Composition shingles and composition sheet roofing both lack stiffness, are readily torn in high winds, and cannot be so securely attached. If it is easy for the wind to get underneath, the covering is then doomed. This is true of sheet metal coverings.

The experience with burned clay roofing tiles in hurricanes has not been very satisfactory. Not only have the roof coverings been destroyed, but the flying fragments cause immense damage by breaking windows in nearby houses. The breaking of the windows frequently constitutes the first step in the destruction of a house by hurricane. The wind must be kept out of a building. This means that special precautions must be taken to protect openings. The use of large single panes of glass should be avoided. Where hinged wooden shutters or rolling steel shutters, as described in the previous article, are not feasible, very heavy

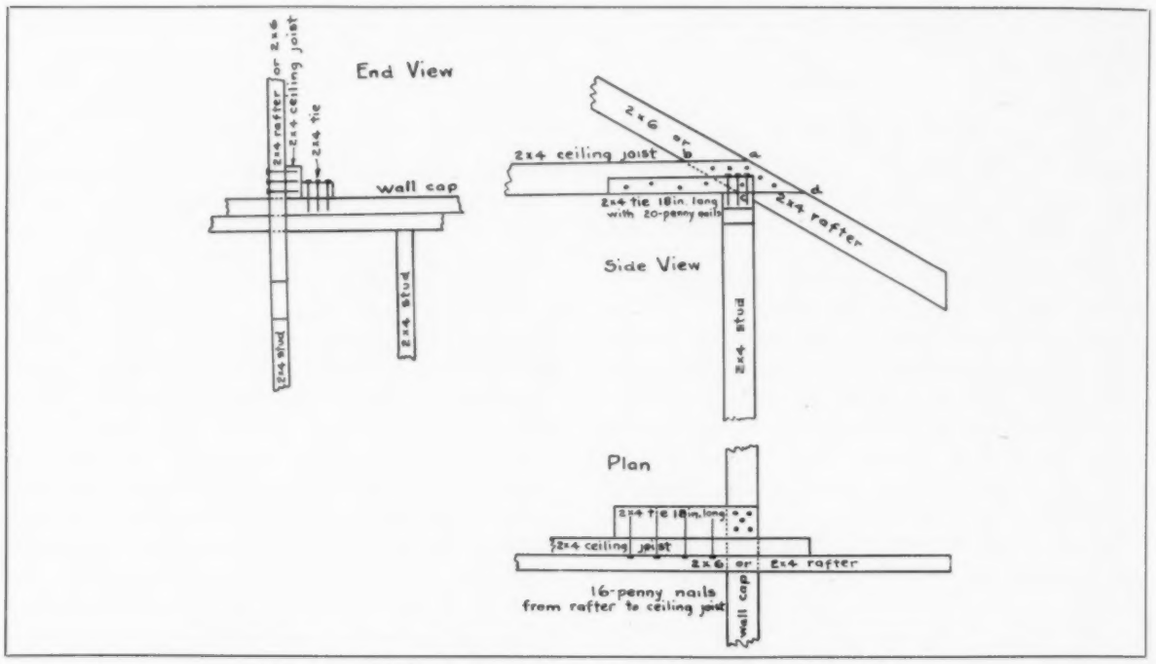


Fig. 9. A Method of Anchoring the Roof to the Exterior Walls

glass in subdivided all-steel frames designed to withstand a wind pressure of 40 pounds per square foot of window surface will prove adequate. Since flying pieces of roofing tiles have been known to penetrate even stucco walls during a hurricane, unprotected windows, even in steel frames, however heavy the glass, would surely be broken in regions where there are tile roofs. The writer is aware of the immense difference in architectural charm between a roof of hand-made mission tiles laid irregularly and one of machine-made tiles attached with monotonous regularity. But irregular laying does not permit the upper tiles to be nailed, and hence they are merely wired to keep them from sliding down the slope of the roof. In consequence, during a heavy gale they are uplifted, dangle at the ends of the wires, and are soon dashed to pieces. The folly of laying tiles without even wiring, when the slope of the roof is very gentle, is too apparent to even require comment.

Both the hazard and the menace of the loose or wired tile roof would be considerably reduced if proper precautions were taken in laying the roof. Of course, a substantial weatherproof roofing felt should first be laid on solid, smooth roof sheathing; then on top of the felt, at spacings varying from 10 to 14½ inches, depending on the type of tiles to be used, there should be placed 2 by 3- or 2 by 4-inch wooden roof strips to which the upper tiles are to be nailed. At the spacings, these wooden strips will assist materially in holding down the felt, and, provided the felt is well cemented along its horizontal edges, they will thus keep the roof rain-tight, should some of the tiles be blown off. Machine-moulded tiles are usually much stronger than the hand-made. Manufacturers should provide two nail holes spaced about 4 inches apart along the center line of each tile, instead of only one, as is the present practice. The top tiles should be attached with two 10-penny nails in conjunction with lead washers, so that the nails can be driven just tight without breaking the tiles; the bottom tiles should be attached with two 8-penny nails and lead washers. While the inherent weakness in nearly all patterns of tiles lies in the fact that they must be so laid that the wind may gain access underneath the tiles, the writer nevertheless believes that two-nail, machine-made tiles regularly and carefully nailed, as described here, should weather any storm, if they are not exposed to a bombardment of debris.

When the roof is of the flat type, surrounded by a parapet wall, another type of construction will give not only a hurricane-proof covering but also a permanent wearing surface capable of withstanding all the hard usage that ordinarily comes on floors, thus adding another, though open, story to the useful floor area of the building. Referring to Fig. 8 (page 746) of the article in the issue of November, 1928, it will be seen that the parapet wall should be made low, preferably not more than 20 inches high. This is to minimize the overturning moment of the wind against the wall. The diagonal sheathing of the top story should extend without break clear up to the coping of the parapet. This will prevent the overturning of the parapet wall, a frequent type of failure,

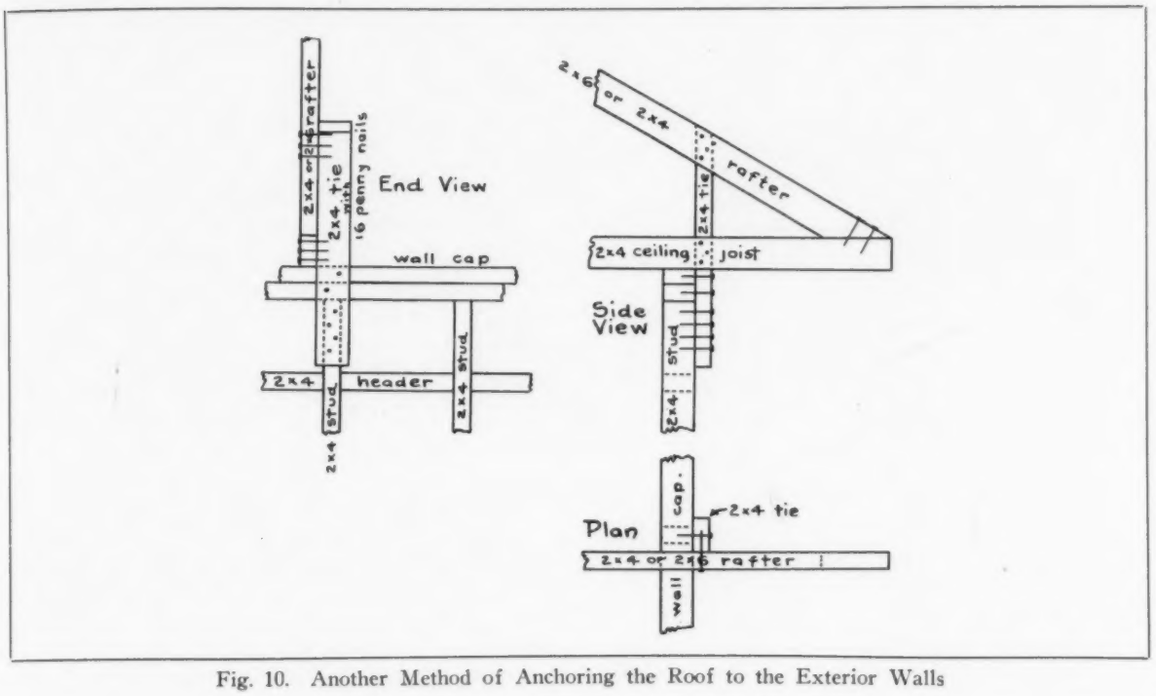


Fig. 10. Another Method of Anchoring the Roof to the Exterior Walls

which permits the wind to get under and raise the roof. The roof boards should be of 1-inch dressed material laid solid and diagonally on 2 by 6- or 2 by 8-inch ceiling joists spaced from 12 to 16 inches, center to center, depending on their span. The entire roof area should then be covered with a layer of sheet lead 1/16 inch thick, lapped and soldered at all joints and brought up 4 inches as flashing at all sides and at chimneys and vents. On top of the lead a continuous slab of concrete should be poured to a uniform thickness of at least 1½ inches; 2 inches would be better. In order to resist shrinkage and thermal stresses, the slab should be reinforced by electrically-welded steel fabric placed at its half depth. A rectangular mesh composed of No. 11 gauge wires, spaced 6 inches in each direction, would be satisfactory. The concrete should consist of a 1 cement: 1½ sand: 2½ crushed rock or gravel mixture to which is added the least quantity of water that will produce a dense and workable mass. The sand should range in size from fine to ¼-inch; the coarse aggregate, from ¼-inch to a maximum of ½-inch. Particular care should be taken to keep the slab constantly moist by spraying it for a period of ten days after pouring so that this thorough seasoning will insure high abrasive resistance in the wearing surface. The lead lining is necessary to insure a water-tight roof. The roof boards are necessary to support the lead lining. Wherever such a concrete-slab flat roof or a tile-covered gable roof is used, the exterior walls and underpinning must be particularly well braced in localities where earthquake resistance is a factor to be considered, because such coverings make a building top-heavy; their inertia subjects the walls to very severe horizontal thrusts.

The Framing of Gabled Roofs. Whatever the type of covering, the foundation of a roof should always consist of 1-inch dressed boards laid solid. For coverings of the lightest weight, 2 by 4-inch rafters should never be spaced more than 24 inches apart, while for tiling, 2 by 6-inch rafters may require a 16-inch spacing. Where a roof is without hips or valleys, the rafters must be diagonally braced in the plane of the roof in the same manner as described previously for outside walls. The anchorage of the rafters or framing of the roof to the walls is a critical feature in designing against hurricanes. Figs. 9, 10, 11 and 12 give full details of some satisfactory types of anchorage at outside walls. To avoid splitting wherever large nails are shown concentrated in small clusters in short splices or tie pieces, these timbers should be drilled to receive the nails. In Fig. 12, 1 by 8-inch ties and truss members are advocated where shown so as to provide ample nailing areas, a b c d, for many 8-penny nails. Fig. 10 shows the strongest anchorage. The smaller the overhang of the roof at the eaves, the less will be the wind pressure in this pocket.

In conclusion, from the standpoint of resistance to hurricanes, the best type of roof covering is a 2-inch flat reinforced concrete slab surrounded by a parapet wall not higher than 20 inches and continuous in construction with the wall of the story below. Such a roof is also fireproof. Being lined with sheet lead, it should remain leak-proof.

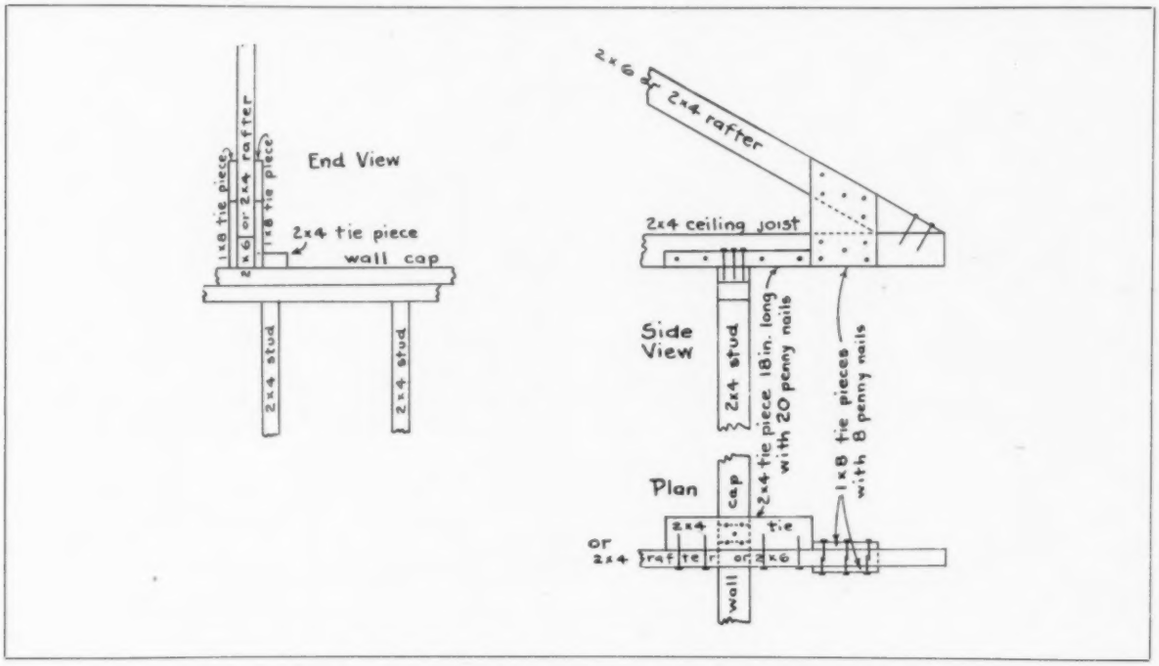


Fig. 11. A Third Method of Anchoring the Roof to the Exterior Walls

Chimneys and Fireplaces. Until comparatively recently, brick masonry in conjunction with fire-clay flue linings has been used almost exclusively for this purpose. As a precaution against fire, insurance underwriters require a clear space of at least 2 inches between all wooden framing and the outside of a brick chimney. This means that structurally the chimney stands completely isolated from the frame of the building; they are not in contact; the chimney is not anchored to the frame. When the building sways during a severe earthquake, so does the chimney, but they do not sway in unison; they cannot, because of the dissimilarity in the distribution of their masses. Consequently, there is impact between chimney and building, because the 2-inch clearance is insufficient to allow the chimney to sway freely within its enclosure, either within or at the side of the swaying building. Such impact is very injurious to the chimney, because brick masonry is not only inflexible but also very weak in tension perpendicular to joint. The chief break occurs usually at the roof line; serious cracks probably occur also at other places concealed within the wooden walls, and constitute a great fire hazard, frequently not suspected. If the mortar is weak, the top disintegrates into separate bricks as it falls; if the mortar is strong, the entire top falls in one mass, sometimes through the roof. If an attempt is made to anchor the chimney to the roof by running metal stays from the roof to a metal collar surrounding the chimney, such stays will probably operate to push over the chimney top. Isolated brick chimneys, already built and standing apart from other structures, as they occasionally do at factories, may be protected against earthquake damage by enclosing them throughout their entire height in a steel cage composed of vertical and horizontal structural shapes welded together, but such a method is not practicable for residential brick chimneys.

After severe earthquakes the writer has seen brick chimney tops thrown down by the hundreds, outside brick chimneys in complete ruins, and some inside brick chimneys dropped down through houses into the basements, as the result of structural collapses of brick fireplaces. The behavior of brick and other block masonry chimneys in the past amply justifies the conclusion that they cannot withstand severe earthquakes without being seriously damaged. Therefore the writer strongly advocates the use of reinforced concrete in place of brick for residential chimneys where earthquakes occur. Reinforced concrete is flexible; it can stand tension and bending without being seriously fractured. When correctly designed and properly constructed, it possesses great tenacity. These are the qualities that make reinforced concrete structurally so superior to brick masonry for chimneys in earthquakes. If the architectural design demands a brick chimney, it is very easy to use a brick facing on a reinforced concrete structural core, but there must be a sufficient number of wire anchorages from concrete to brick at definite intervals, vertically and horizontally, as otherwise the bricks will be shaken off.

In constructing a reinforced concrete chimney, the fire-clay flue lining is used as the inside form.

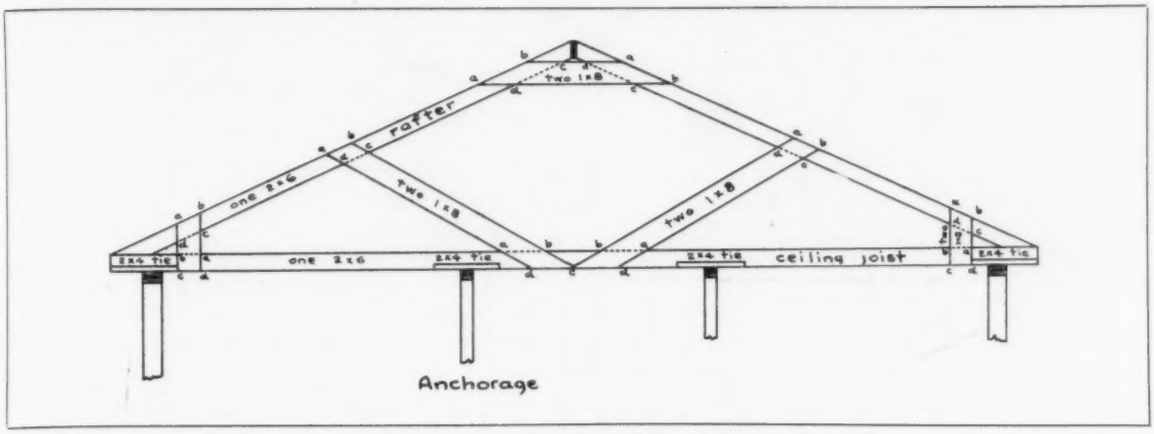


Fig. 12. Anchorage of Roof Framing Against Hurricanes

Reinforced concrete is superior to brick also in that it lends itself more easily to producing solid construction where flues from lower stories must be curved around fireplaces. Furthermore, at no increase in cost, reinforced concrete permits the use of circular flues, which are much more efficient for unit area of opening than square or rectangular flues.

For a single-flue chimney of average size in a one-story building, the minimum thickness of reinforced concrete wall, exclusive of flue lining or outside brick facing, if such there be, should be 6 inches, if the flue is square or rectangular. If the flue is circular, it may be 4 inches, but the walls of the fireplace should be of at least 6 inches in addition to the lining of brick. Since it is difficult to line the inside surface of the sloping walls of the smoke chamber above the fireplace, this lining may be omitted if the thickness of the concrete there is increased 1 inch. In the basement and lower story of a two-story house this minimum should be increased 1 inch; it should be 7 inches for circular flues also, if the chimney contains a fireplace at the second story. In the basement and lower story of a three-story building, the minimum thickness, irrespective of the shape of the flue should be 8 inches. The thickness of the fireplace walls should never be less than the thickness of the chimney walls immediately above the fireplace. These minimum thicknesses are merely suggestions for average cases. If a chimney contains a large number of flues, or very large flues, they should be increased by 1 or 2 inches. The minimum thickness of concrete between adjacent flues in a multiple-flue chimney should be 3 inches for circular flues, but 4 inches for square or rectangular flues.

The concrete mixture should not be leaner than 1 cement: 2 sand: 4 gravel or crushed rock; preferably it should be about 1: 1½: 2½, because it is very necessary that the chimney walls be strong, and particularly that they be non-porous. The sand should be graded in size from fine to ¼-inch; the gravel or crushed rock should vary from ¼-inch to a maximum of 1-inch. The minimum amount of water should be used that will produce a workable mixture which will settle readily in the form when slightly rammed with an iron rod. In constructing the form, one side should be left open; this side should then be closed from the bottom up,—only about 3 feet in elevation at a time, so that there may be easy access for thorough tamping as the concrete is being poured. The entire form should be kept moist by sprinkling for 7 days after the pouring.

The reinforcement should consist of corrugated round or square steel bare placed vertically, together with square or rectangular intermittent horizontal loops at regular vertical intervals. These loops act as lateral ties for the vertical reinforcement; they are wired to the verticals and should inclose them completely. In multiple-flue chimneys they should have cross ties of the same size, as shown by AB and CD in Fig. 13. The ends of the loops must be securely anchored, as at E, rather than be merely overlapped; this applies also to such joints as at A, B, C and D. The dotted lines in Fig. 14 show how these horizontal ties should be arranged between the hearth and the top of the fireplace opening. They should be anchored as shown around verticals marked N and P. The hearth should consist of a flat slab of reinforced concrete 4 inches thick, reinforced with an electrically-welded 6 by 6-inch square mesh consisting of No. 10 gauge galvanized wires. The total cross-sectional area of vertical steel at any horizontal section of the chimney or fireplace should not be less than 0.004 times the cross-sectional area of concrete; it should be placed 2 inches from the outside surface. Bars should always be placed at the corners; intermediates should not be more than 12 or 15 inches apart. The minimum diameter of the bar should be ⅝ inch; lengths of overlaps at splices should not be less than 24

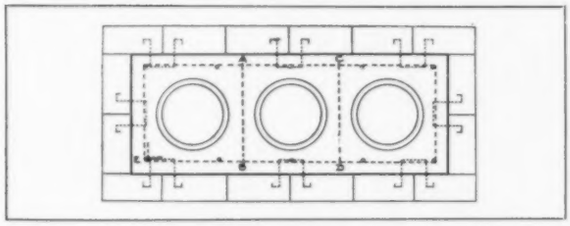


Fig. 13. Anchorage of Brick to Concrete Chimney

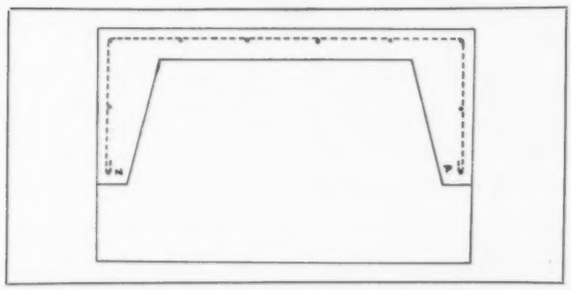


Fig. 14. Horizontal Ties in Reinforced Concrete Chimney

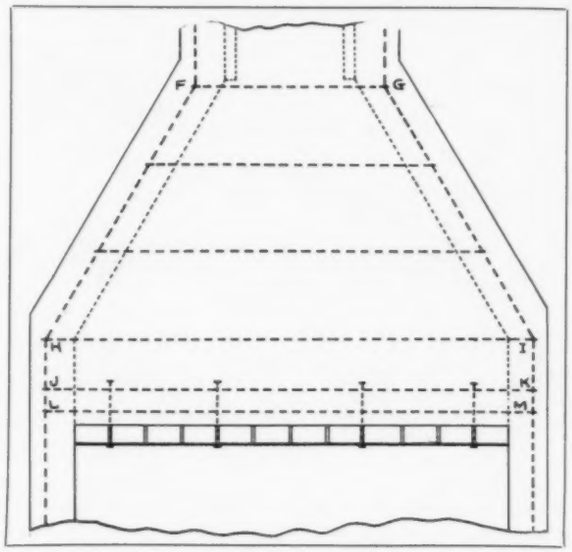


Fig. 15. Reinforcing of Chimney Throat Above the Fireplace

bar-diameters. The loops should be spaced 12 inches apart, vertically. Where the walls of the chimney are all vertical, the bars should be at least ¼-inch in diameter in one-story, 5/16-inch in two-story, and ⅜-inch in three-story chimneys. Where there is a contraction in the width of the chimney, as just above fireplaces and also between the hearth and the top of the fireplace opening, the loops should be of the same diameter as the vertical steel bars, and should be placed also just at the bends in the verticals. See loops FG and HI in Fig. 15. Two loops should be placed just above the soffit of the fireplace opening, as shown by JK and LM in Fig. 15. They will then serve also to reinforce the top of the opening. For openings of up to 5 feet in width, these should be ¾-inch square corrugated bars. In Fig. 15, the concrete soffit of the opening is protected against excessive heat by one course of brick, held in place by a steel plate extending the full width of the opening, and held as a shelf support for the brick by anchor bolts embedded at intervals in the concrete above the soffit.

Brick facings on reinforced concrete chimneys should always be anchored to the concrete by metal bonds, as otherwise the bricks will be shaken off in a severe earthquake. A device of wire is usually superior to one of sheet metal, because the latter will be destroyed more quickly if rusting occurs. Fig. 13 illustrates a method where soft steel wire of No. 12 gauge is employed. Approximately every seventh course of brick facing should be so anchored by embedding the wire in the mortar of the joint. Wherever feasible, these wire bonds should engage the horizontal or vertical reinforcement of the chimney. In any case they should have a hooked anchorage in the concrete of at least 2 inches. The ends of the bond wires should not be left straight, for then their hold in the brick mortar will be slight, but, after removal of the chimney form, they should be hooked as shown, and not merely given a right-angle bend. When, for architectural reasons, only the top of a chimney need be faced with brick, as in the case of an interior chimney, in order to avoid the earthquake stresses that are accentuated by top-heaviness, below the brick facing the concrete section should be increased to the dimensions of the composite section of concrete and facing in the top. This increased section should be maintained at various lower levels until it merges into a larger section, such as that demanded at a fireplace, for example. Special care should be taken to make the foundation area of the chimney of such dimensions that the unit pressure on the subsoil will equal that of the foundation of the rest of the house, as otherwise differential settlement will cause serious cracking in fireplaces, in interior plaster at the chimney, and injury to flashing at the roof.

In regions where earthquakes are severe, reinforced concrete chimneys should be securely anchored to wooden building frames; interior chimneys, by having the joists at each floor level framed snugly against all four sides of the chimney; outside chimneys, by strong steel enclosing bands bolted to the frame. A reinforced concrete chimney, designed and built as described here, will neither crack nor shatter in a strong shake, if it is anchored to a properly braced building on a good foundation. This contact of chimney and frame would therefore produce no appreciable increase in fire hazard, but there would be much structural benefit by preventing impacts.

THE SUPERVISION OF CONSTRUCTION OPERATIONS

BY

WILFRED W. BEACH

CHAPTER 1. INTRODUCTORY

PART of the duties of the master craftsman in connection with a building operation has always been the direction of the activities of his co-workers and passing upon their work. As time rolled by and the duties of the master craftsman evolved into the more diverse functions of the modern architect, the supervision of the construction of a building developed into one of the main departments of his endeavors. Since he has elected to confine his efforts to the production of his building by means of the hands of others, it devolves upon him to see that those proxies of his are both capable and honest in the work of carrying out his true intent. He must safeguard the interests of the owner until the finished building is delivered, and must do it as well as if he were actually laboring, as of old, with his journeymen and apprentices at the site. This implies on the part of the architect, in the capacity of building superintendent, an intimate knowledge of all materials entering into the construction of a present-day building and, as well, of the correct manner of their placement. When Vitruvius presumed to set before his august emperor his famous inventory of the attributes of the well rounded architect, he could hardly have been expected to include more than a small fraction of those comprised in the attainments of the twentieth-century practitioner;—and yet the list compiled by that ancient architect was somewhat formidable.

It is, of course, humanly impossible for a single individual to know all there is to know about a building operation, from the clearing of the site to the installation of the last piece of equipment,—and yet the degree of possession of such knowledge and the amount of practical experience in its application are the gauges by which the work of the modern superintendent is measured. The owner expects and demands perfection in this office, and will be satisfied with little less. When he, with his admitted inexperience, notices defects that have escaped the keen eye of the man paid to find them, his faith in that keenness is materially lessened. Or, if later "wear and tear" bring out weaknesses that a close adherence to specification requirements would have prevented, the owner, put to serious inconvenience, perhaps to damage claims of tenants, is likely to blame the architect's superintendent more than the contractor. The latter was supposed to look to his own interests, but the architect and his representative were "well paid" to see that nothing was slighted. True, the architect has made it plain, in undertaking to supervise the work, that he is acting only in capacity of assistant to the owner in seeing that the terms of the contract are complied with and that he, most emphatically, is not taking upon himself any of the contractor's liabilities. This relieves the superintendent of legal responsibility,—but he must still shoulder the moral blame for his shortcomings, and his punishment for remissness, large or small, will be found in the attitude of the owner toward the influencing of future business in which the architect is interested. In this, whether the work be the owner's or that of others, the degree of satisfaction of the client in the way a job is supervised may be of as much as or more importance in weighing his support than that of any other item of the service rendered.

With full realization, therefore, of the importance of the responsibilities devolving upon him, a wide-awake superintendent will prepare himself to the best of his ability to meet the various emergencies that may be expected to confront him on a given work, as well as many of those that are not to be counted upon in advance.

While it is true that the dependable building superintendent is a man of experience, it is no less true that he has much to learn from the experience of others,—and at a considerable saving in cost to himself and to those by whom he is employed. Unfortunately, the booksellers offer a dearth of books on the subject, and of those in the libraries the majority are now out of print. Some of the best of these are English or continental and apply but inadequately to American conditions. Again, in all works on building superintendence, there is a tendency to combine construction design or specification writing, or both, with field supervision, thus producing a volume or volumes of more bulk than is actually needed by an outside man.

In this series of articles, the author will endeavor to confine himself to matters of most direct interest to superintendents, clerks-of-the-works, and inspectors, leaving matters of design to those in the office to whom such duties properly belong. Not that the field man is in any way independent of his indoor confreres; on the contrary, their inter-dependence is akin to that of the voussoirs of an arch, upon which the whole structure is supported. Coöperation and esprit de corps mean much in the success of a construction undertaking. The kind of superintendent who delights in picking flaws in the drawings and specifications, even calling the attention of contractors to them unnecessarily, will find himself cordially hated at the home office and should be promptly replaced, no

matter how able he may otherwise be. He will eventually produce the impression, if permitted to remain, that the work of the office is untrustworthy. But that superintendent who can correct errors and iron out discrepancies with the greatest smoothness will find excellent backing from his co-workers. If his tact and diplomacy are logically extended to his dealings with contractors, his value to his employers will be limited only by his general building knowledge, experience and attention to his duties.

Of particular importance is the close relationship between the superintendent and the specification writer. The latter, if his time is entirely occupied with that work, lacks the direct touch with actual construction which is essential if he is to approximate the ideal documents which he should be striving to produce. Through the constructive criticism of the superintendent, he gets the needed practical touch, finds out wherein his clauses are weak, inappropriate or over-exacting, and can thus steadily improve his output.

The author is treating of the superintendent as of one whose entire time is devoted to such work, and will continue to speak of him in the abstract, striving to make his effort of value both to the old timer and to the beginner, and also to the architect himself who, because of choice or necessity, is looking after his outside work personally. The architect, if a young practitioner, may be as much in need of guidance in interpreting his specifications and in seeing that their stipulations are carried out as would be the case with his employe.

The thing most needing correction in many offices is slipshod, unbusinesslike procedure. As a rule, more and better records should be kept. Applied to field work, this means the inauguration of a set of rules for conducting a construction job and insistence upon close adherence to those rules. All carelessness should be eliminated, from the head of the concern down to the office boy. The modern architect may be a very fine artist,—should be if he is to arrive at the top of his profession,—but, if he is to be successful, he should, first of all, make himself a good executive. The first evidence of the lack of proper care in the administration of a job is frequently encountered in his initial dealings with his client. Either he has no contract at all or his memorandum of agreement is too vague, especially as to the amount of supervision the construction is to receive.

The form of "Articles of Agreement between Architect and Owner," published by the Illinois Society of Architects (Form No. 26, Revised March, 1923 and June, 1924) says in paragraph (e) of Article II that "General Supervision of the Work" consists of "such inspection by the architect or his deputy of work in studios and shops or at the building or other work in process of erection, completion or alteration, as he finds necessary to ascertain whether it is being executed in general conformity with his drawings, specifications and directions. In acting in this capacity his authority and status will be as defined in the 'General Conditions of the Contract' of the 'Illinois Building Contract Documents', which 'Illinois Building Contract Documents' are by reference made an express part of this agreement. He has authority to reject any part of the work which does not conform with the spirit and intent of the plans and specifications and to order its removal and reconstruction. He has authority to act in emergencies that may arise in the course of construction, to order necessary changes, and to define the meaning and intent of the drawings and specifications. He is not obliged to give continuous personal superintendence, but should the Owner require this service, the Architect will employ a clerk-of-the-works or inspector to render such assistance under his direction at the Owner's expense."

In the "Conditions of Agreement between Owner and Architect" published by the American Institute of Architects, Article 9, "Supervision of Work," reads: "The Architect will endeavor to guard the Owner against defects and deficiencies in the work of contractors, but he does not guarantee the performance of their contracts. The supervision of an architect is to be distinguished from the continuous personal superintendence to be obtained by the employment of a clerk-of-the-works. When authorized by the Owner, a clerk-of-the-works acceptable to both Owner and Architect shall be engaged by the Architect at a salary satisfactory to the Owner and paid by the Owner, upon presentation of the Architect's monthly certificates."

Clinton H. Blake in "The Architect's Law Manual" has to say on this general subject: "With respect to this whole question of the contract between the client and the architect, whether the form preferred is the Institute form or another form, it must be remembered always that the practice of every architect has certain special characteristics which distinguish it from the practice of other architects. To secure the best results, each architect should have prepared for him the form of contract which meets the special requirements and conditions of his own practice. The best use which the architect can make of these forms is not to adopt one of them bodily, but to use them as a guide in evolving the form of contract best suited to his own practice and specially prepared to meet his own problems."

This custom has been followed by the author, whose paragraph on supervision is some near variant of the following: "For the purpose of supervising the work of contractors, the Architect or his Representative will make visits to the site (or

to places where material is being prepared for use in the structure) of such frequency and duration as the nature of the work in progress may necessitate and will, during such visits and by means of correspondence and interviews between visits, use his best endeavors in properly instructing contractors in the work to be done and seeing that they correctly fulfill the terms of their contracts and maintain an effective going organization of all engaged upon the work. The Architect will pass upon the merits of materials and workmanship, audit contractors' accounts, prepare estimates of cost of original work and proposed alterations, issue orders for changes sanctioned by the Owner, give certificates for payments to contractors, and generally assist the Owner in enforcing the terms of the contracts; but the Architect's supervision shall not include liability for any breach of contract by a contractor, nor is the architectural service, under this contract, to include any of the duties ordinarily considered as belonging to a builder or contractor, nor shall such supervision be construed to mean the continuous oversight of a superintendent or clerk-of-the-works. The Architect reserves the privilege of recommending the continuous employment of a clerk-of-the-works for such period of the construction as he deems advisable and at such remuneration as may be approved by the Owner; such employe to be on the Architect's payroll and his pay billed to the Owner and paid for by the Owner in addition to other sums due the Architect. But the employment of such clerk-of-the-works will not relieve the Architect from the performance of his duties as above set forth nor tend to lessen his responsibilities in supervision."

In the last analysis, the Owner will, of course, get whatever supervision from the Architect the latter considers the job is entitled to receive and that he is in position to afford. The point is that he and the owner shall understand each other on the subject, and that the latter shall not expect too much. The suggestion of the employment of a clerk-of-the-works contained in the form given above has been found to take care of this point quite efficaciously. In this, as in all other matters touched upon, we assume that the architect is of the ethical type who has always at heart the best interests of the work upon which he is engaged.

Inasmuch as there is a wide divergence in the method and personnel used in handling supervision in the offices of architects, it is advisable that we adopt certain arbitrary designations and expressions which are readily understood, though they may not be current in some localities or in all offices in any locality. In a general way, we shall treat of the supervision of all operations incidental to the construction and equipment of a million-dollar high school, situated in an ordinary town or small city, and in the customary somewhat isolated location. This is a comparatively simple engineering and construction problem, fairly typical, and will bring out some phase of each of a superintendent's duties and many of his worries.

The architect is assumed to be living in another city and making fortnightly visits to the work. His duties are thus supervisory, the actual superintendence being performed by a clerk-of-the-works whom, for convenience, we shall call the superintendent. He gives his entire time to the work and is paid by the architect who, in turn, assesses the wages and other expenses of supervision against the owner, to be added to the architect's fee, as is the best approved practice.

For clarity, we shall from time to time use diagrams and excerpts from the specifications, but all building drawings are purposely omitted in order that we may not become too specific on various subjects. For the same reason, we shall take occasion to digress from the particular building we have under consideration, as may appear advisable.

Of prime importance to a superintendent who finds himself at a distance from the home office is an intimate, definite knowledge of the methods in vogue with his employer. He must know, as nearly as may be, just what is expected of him day by day during the entire progress of the work. To this end, nothing is more helpful than a carefully prepared set of instructions. It is invaluable to a novice and scarcely less so to the older head, even if the work under construction is not remote. It will save a lot of conversation, correspondence and other lost motion;—it will also deprive the superintendent, perchance, of some otherwise convenient "alibi"!

CHAPTER 2. THE DUTIES OF SUPERINTENDENTS

THE instructions in this chapter are a composite of those prepared for four different architects' offices. They contain the gist of the rules of procedure needed by a new man going to his first job or by an older man under a new employer. Much that is contained in these instructions is obvious, but its reiteration will serve to emphasize its importance. No such rules can be sufficiently comprehensive to meet all conditions that may arise. Perhaps in no other field, therefore, is the training of an experienced man of more immediate value. He must not only be possessed of proper initiative, but must have sufficient confidence in himself and his judgment to

take a positive stand when occasion requires. A man who changes his mind frequently, reversing his rulings under pressure, has no place in this important office. Of course, if he has made a mistake and is manifestly wrong, he should not be so "bull headed" as to refuse to back down; but too many such mistakes will pointedly demonstrate his unfitness for the work.

A talkative superintendent is less valuable than one who is aloof or taciturn. One who makes himself agreeable without being unduly sociable is ideal, other things being sufficiently to his credit. He is there to see and understand everything that goes on, but not necessarily to talk about it. Tact is his chief asset, next to his knowledge and experience. This means, among other things, that all criticisms and adjustments are to be taken up with the contractor himself or his chief representative on the job and not, except in case of emergency, with any subordinate. Nor should a contractor or foreman be censured to his men or in their presence. The superintendent is to promote a smooth-running job and must avoid creating disturbance or unrest. A novice in this position must guard against being either too timid or too eager to show his authority. For this reason, he should not have too much authority vested in him until he has outgrown his novitiate. It is easy to say: "Tear that down; it's all wrong," but nothing will disrupt an organization more quickly. If one sees masons laying a wall 12½ inches thick with no mortar in the longitudinal joints when the drawings call for a 13-inch wall and the specifications say that "all joints shall be slushed full," it is easy to take the foreman to one side to discuss it with him and give him opportunity to move his men to another point until a decision has been made. The architect may take note of the fact that this particular piece of basement wall is merely a curtain wall and may not be particular about it; or he may decide that, because too much of it has been laid to make it a simple matter to have it razed, it is expedient to compromise with the contractor on the basis of a contract-price deduction. But the creation of an uproar on the job should be avoided by all means, if possible.

Every experienced architect and superintendent knows, however, that too much temporizing or compromising with contractors on a job is not good for it. Some superintendents are too accustomed to want to "trade" with a contractor here and there as the work progresses. It is easy to acquire this habit, and it is equally easy to allow the habit to grow into a serious evil. Particularly is this true when it comes to a matter of rectifying the architect's mistakes or those of his employes. He will find the contractor quite ready to curry favor by offering to make a correction at his own expense in exchange for some privilege, the which actually causes the innocent owner, in the final analysis, to pay for the shortcomings of the architect. That architect who is as prompt to admit his own errors, and to pay for them if need be, as he is to call attention to those of the other fellow, cannot fail to win respect thereby.

All these pertinent facts, and many more are in the back of the brain of the older head,—learned, he might say, in the "school of hard knocks," and ready to be applied as opportunity offers. Definite instructions can only be general, but a superintendent is entitled to something of the kind that will serve to acquaint him with the custom of the particular office in charge of the job. Architects just starting independent careers might advantageously copy the following instructions, condensed or augmented as deemed advisable. Something of the sort should also be adopted in offices where definite rules have hitherto been lacking.

INSTRUCTIONS TO SUPERINTENDENTS

1. *Classifications of Construction Superintendents.* This office employs three types of Superintendents, each of whom shall report directly or indirectly to the Chief Construction Engineer:—

A. "Superintendents-in-charge" shall be the only men supervising construction who are entitled to be called "Superintendents." They will be in complete charge of major work under their jurisdiction, empowered to interpret drawings and specifications, issue orders and to make use of the firm's signature (with certain restrictions), but are not authorized to order other than minor changes, nor any changes involving additions to or deductions from the contract price. Superintendents report directly to the Chief Construction Engineer, will be in charge of one of more jobs and will, in each case, have one or more inspectors assigned to assist them.

B. A "Clerk-of-the-works" is employed to supervise certain operations as an observer only, is not authorized to issue orders or to make use of the firm's signature, except when particularly authorized to do so by the Chief Construction Engineer, to whom he reports direct.

C. The duties of an "Inspector" are similar to those of a Clerk-of-the-works, except that an Inspector receives orders and reports to the Superintendent-in-charge and not directly to the Chief Construction Engineer. The use of the firm's signature cannot be delegated to an Inspector.

The following instructions are intended primarily for the guidance of Superintendents and Clerks-of-the-works. Inspectors shall also familiarize themselves with these instructions and shall follow such as are applicable to their duties.

2. *Job Classification.* The operations out of this office are classified as "Major" and "Minor"; "New Work" and "Alterations"; and as "Local" and "Out-of-Town." Supervisory duties vary accordingly.

A. A Major Operation is one on which the Superintendent has one or more Inspectors assisting in the supervision.

B. All other operations are deemed "Minor."

The Chief Construction Engineer will determine the status of each job and make his assignments accordingly. He will also advise Appointees of any special duties or exceptions not in accordance with these instructions, which latter will otherwise apply in full force, without exception.

3. *Preliminary.* Immediately upon being assigned to a job, the Appointee must ascertain its classification, exact location and the time set for his first visit. He will, if feasible, be allowed from a day to a week in the Home Office, before going to the job, in which to familiarize himself with all phases of the work. When such time allowance is impracticable, he must take the first available time to accomplish this. He has no limiting working hours, but must use whatever time is needed for the performance of his duties, keeping always at least "one jump ahead" of the work on the job. He will be supplied with complete specifications and working drawings (including details and shop drawings) and a copy of the contract; also all addenda and special orders and correspondence affecting them. He will be provided with a suitable container in which he shall keep all prints and other documents pertaining to the work, including a complete file of job correspondence, for all of which he will be held individually responsible. If warranted, he will be permitted to requisition an office desk, chair and typewriter; also additional necessary equipment when a stenographer or other clerk is assigned to him.

4. *Working Drawings and Specifications.* The Appointee must make sure that his set of drawings and specifications is of latest issue and complete for all contracts. He must give both a thorough check, one against the other, as the best method of familiarizing himself with all documents. This will necessitate reading the contract and specifications,—every word, including the general conditions, printed or typed.

Notes must be made of apparent discrepancies, errors or other features not perfectly clear and each point be carefully set forth in a letter to the Home Office, except that matters of lesser import may be checked over with the Chief Construction Engineer as opportunity offers. But no such matters should be allowed to drag. They should be settled promptly, orally or by letter, and record made accordingly, corrections pertaining to drawings being noted thereon in ink or colored pencil.

5. *Contracts.* The Appointee must make careful note of all provisions of all contracts and the general conditions directly affecting the initiation of the work, such as:

A. Securing permits.
B. Soil tests. Boring or other records, if any.
C. Time limits. Schedule and Penalties.
D. Insurance, all kinds.
E. Bonds, if required.
F. Provisions for extras and overtime work.
G. Provisions for "force-account" or "cost-plus" work.
H. Provisions for union labor, if any.
I. Contractors' statements and methods of payments.
J. List of Subcontractors and how approved.
K. Provisions for shop drawings, samples and models and their approval.
L. Progress photographs, how many; when.
M. Provisions for laying out of the building.
N. Provisions for protecting property adjoining, if needed.

6. *Survey.* The Appointee must secure a copy of the survey, if one has been used, and see that the plans are in conformity therewith. He must definitely ascertain the relation between existing grades and datum and get the location of bench mark, if any has been established; if it has not, find out how it is to be established and see to it.

7. *Shop Drawings, etc.* He must secure copies of all approved shop drawings and make arrangement for future issues to reach the job promptly, both for the use of contractors and himself. He should not hesitate to keep the Home Office reminded that certain shop drawings are due or overdue. Such insistence may prevent avoidable delays. The same is true of approval of samples and models, as well as catalogs and manufacturers' specifications, to which reference has been made in the job specifications. Copies of all such must be on file in the job office while work is under way.

8. *Building Codes.* He must secure, or have access to, a copy of the city or state Building Codes (or both, if there be such) governing local conditions and give himself a working knowledge of them, as far as applicable.

9. *Office Blanks.* He must requisition such of the following stationery as will meet his job requirements:—

A. Office letterheads.
B. Envelopes; large, small and self-addressed.
C. Departmental correspondence sheets.
D. Carbon sheets.
E. File copy sheets.
F. Report blanks; daily, weekly and monthly.
G. Telephone record blanks.
H. Box files.
I. Scratch pads.

Note that the scratch pads are intended to save wasting other stationery and marking on blueprints, both of which are to be avoided.

10. *Job Duties.* It is assumed that the Appointee arrives at the site either before or shortly after the excavating has commenced. If not, he will take up his duties at the stage of progress at which he finds the work and make such inspections as are necessary to place himself in command of the situation, thereafter devoting such time to it as is required or allotted. His general duties are to see that the job goes forward according to schedule (or better), that contractors understand the drawings and specifications, and that they honestly carry out the terms of their contracts. Specific duties are such as may be directly assigned by the Chief Construction Engineer. Both duties shall receive the best attention of the Appointee.

11. *Reports.* Report blanks shall be filled out fully and clearly, daily, weekly and monthly, as directed, always regularly and promptly, so that the Home Office can "see and hear" exactly what is going on. The Superintendent is the eyes and ears of the Office. He must be especially forehanded in anticipating potential causes of delay and doing what he can to remove them; being particularly alert in citing all such in his daily reports and "jacking up" the Home Office if it appears probable that the negligence of someone there may later serve a contractor as an alibi,—alleging lack of coöperation in that quarter. Percentage progress reports shall be made at such intervals as decided by the Chief Construction Engineer and in such form as he may direct.

12. *Mail, Telephone and Telegraph.* Upon arrival (if possible, within the first 24 hours) the Appointee must call at local telegraph and long distance telephone offices and arrange for messages to reach him. For local calls, he will use the job telephone, unless otherwise directed by his Chief. He must secure a permanent mail address, preferably a P. O. box or at his hotel or rooming house, if the latter is not too distant for two daily deliveries. Provision should also be made for receiving special delivery mail at the job office, but it is not good practice to have other mail sent there. Too many have access to it, and it is too easily lost or misplaced. Mail must never be addressed or received in care of a contractor.

13. *Signs.* It is customary for the firm's sign to be located on the premises along with that of the contractors. The Chief Construction Engineer will confer with the general contractor as to how this is to be done. No sign or advertisement may be erected without the Chief's special consent.

14. *Expense Accounts.* Each employe is entitled to an expense account when away from the office on the firm's business. Such account shall be kept carefully, day by day, and may include these items, actually paid out:

A. Traveling expenses, including night Pullman fares.
B. Street car fare and, in emergencies, bus and taxi fares.
C. Hotel and restaurant bills, including only the first day on jobs requiring residence of six days or more.
D. Ordinary tips in connection with the foregoing, not in excess of 10 per cent on any item.
E. Telegraph and long distance telephone calls, only where record of them is on file. Telegrams to the Home Office should be sent collect; all others prepaid.
F. Local telephone calls.
G. Only such other expenditures as are specifically authorized by the Chief Construction Engineer.

Expense memoranda must be sent to the Home Office at regular intervals, as arranged.

15. *Correspondence.* Carbon copies of all outgoing letters must be kept and filed, using separate files for Home Office correspondence and for outside correspondence. All letters received must be similarly filed. Confirmation by letter of all important telephone conversations must be made a habit, the Superintendent either writing them on the blanks provided or insisting upon the other parties' doing so. If an explanatory sketch is sent out with a letter, carbon copy of the sketch must be filed with the letter copy. Copies of orders issued to Contractors modifying contract terms must be attached to the job copy of specifications. In case such orders affect the contract price, a notation to that effect must be attached to the job copy of contract.

16. *Revised Drawings.* Preliminary prints sometimes are issued for the purpose of starting excavating or foundations before all working drawings are finished or revised. When these or later issues are superseded by revised prints, the Superintendent must take careful note of all changes and their effect upon the work already done, as well as that to be performed, and must see that the contractors also have a clear understanding of it. He must also exercise due caution to see that all superseded prints are marked "void" and not left where they might cause trouble.

Editor's Note. This is the first of a series of articles covering in detail the duties, procedure and problems of the architectural supervision of building operations. Realizing the present lack of a definite and adequate treatment of this subject, Mr. Beach has prepared this thorough and informative treatise, based on his many years of active experience and observation. In the February issue, Mr. Beach will continue the "Instructions to Superintendents," and will take up the matter of superintendents' reports, etc. The articles will treat authoritatively of every phase of the work of building supervision for architects and their representatives.

STANDARDIZATION

AS APPLIED TO THE COMPILATION OF WORKING DRAWINGS

BY

E. L. NORBERG

CHAIRMAN OF THE STANDARDIZATION COMMITTEE OF THE NORTHERN CALIFORNIA CHAPTER, A. I. A.

THE architectural profession has in the past been generally criticized, and sometimes justly, for being impractical and lacking in business ability to such an extent that so-called architectural construction companies with their advertised staffs of experts have been securing a large part of the architectural business. So, with the object of promoting the "scientific and practical efficiency of the architectural profession," the Standardization Committee has worked out a number of practical ways and means of standardizing, simplifying and assisting to make more accurate, complete and systematic the architect's office work and, through the use of standard symbols and scientific methods to eliminate wasted effort in the drafting room and to materially assist in the compilation of more accurate and complete working drawings, so that guessing by estimators and extras on the project will be eventually eliminated.

A tentative set of "Standard Symbol Sheets" have been drawn up and consist of:

A. A Standard Symbol Sheet of architectural notations, including abbreviations.

B. A Standard Sheet of Symbols for plumbing work (developed in connection with the Master Plumbers' Association).

C. A Standard Symbol Sheet for heating, ventilating and mechanical equipment.

D. Revisions of the present Standard Symbol Sheet for electrical wiring.

In addition to these symbol sheets, an "Architect's Office Sheet" showing the simplest and yet the most complete manner of indicating different items, schedules and other data not contained in the Standard Symbol Sheets, has been compiled. These sheets have been approved by the Northern California Chapter of the A. I. A., and they were presented at the last national convention of the A. I. A. with the idea that eventually they will be adopted throughout the entire country. In compiling the symbol sheets every effort was made to select symbols that were already in general use and are understood and would be least likely to lead to confusion or misinterpretation. After the final approval of the symbol sheets they will be distributed to all architects of the Institute and in turn to the various engineers, contractors, estimators, etc., down to and including foremen.

Advantages of the Symbol Sheets are that:

A. All architects of the A. I. A. will use the same symbols and notations on their plans, which will be of great assistance to all estimators, contractors and foremen who work with many different architects' plans.

B. Draftsmen will learn the standard symbols and methods, and in moving from one architect's office to another will not be confused as at present, and as a consequence time will be conserved, errors eliminated, and better plans produced at less cost to the architect.

C. It will no longer be necessary to draw a set of symbols and abbreviations on each set of drawings as it is at present. A note will simply say that all symbols and abbreviations are according to A. I. A. Standard Sheets.

In connection with this, model plans embodying these features, will be obtained from the various architects and exhibited for educational purposes. The sheets as at present published are more or less tentative, and it is hoped that architects will study them carefully; any comment or constructive criticism is invited.

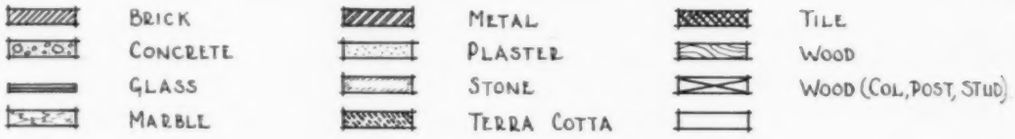
Sheet "A," on architectural notations and abbreviations, is simply a compilation of data as generally used. Sheet "B," on plumbing, was compiled in connection with the Master Plumbers' Association, and its coöperation and assistance were of great help. Sheet "C," like Sheet "A," is a compilation of generally used symbols, and suggestions from the engineering societies will be appreciated. Sheet "D," on electrical symbols, was compiled some time ago by the electrigists and approved by the A. I. A. and has been generally adopted. Only some additions and changes are required. The chief change is in using the figures 2, 3, 4, 5, 6, 7 and 8, which are substituted for the characters that formerly were marked on tap circuits to indicate the number of No. 14 conductors in ½-inch circuits. The "Architect's Office Sheet" is tentative and requires considerable thought and additional data on structural work to make it practical. In addition, this Committee is working out a number of other matters pertaining to drafting room efficiency.

Editor's Note. Constructive criticism of the tentative standards reproduced herewith is cordially invited. It is hoped that not only will there be suggestions in regard to the Symbol Sheets here mentioned, but that other such sheets covering other subjects may be developed and submitted for consideration. All communications may be addressed to THE ARCHITECTURAL FORUM.

SYMBOLS FOR ARCHITECTURAL & STRUCTURAL DATA

MATERIALS IN SECTION.

NOTE:
Old materials Same only Shaded.



ABBREVIATIONS

Basement	Bsmt.	Mirror	Mir.
Blackboard	B.B.	Mullion	Mull.
Bulletin Board	Bull. B.	Muntin	Munt.
Cabinet	Cab.	Natural Grade (Pres).	Nat (Pres) Gr.
Canvas Covered	Can. Cov.	Not in Contract	N.I.C.
Casement	Csmt.	On Centers	O.C.
Cast Iron	C.I.	Panel	Pan
Ceiling	Clg.	Patent Hardware	Pat. Hwd.
Cement Plaster	Cem. Pl.	Picture Mould	P. Mld.
Center Line	℄	Pine - Oregon	O.P.
Closet	Clos.	Sugar	S.P.
Concrete	Conc.	Plaster	Pl.
Cooler	Cool.	Redwood	Rwd.
Cornice	Corn.	Riser	R.
Door	Dr.	Sash Door	Sh. Dr.
Double Hung	D.H.	Screened	Scr.
Down Spout	D.S.	Sheet Metal	Sh. Met.
Drawer	Dwr.	Shelf and Rod	Sh. & Rd.
Finished Grade	Fin. Gr.	Side Light	S.L.
French Door	Fr. Dr.	Sliding Door	Sl. Dr.
Galvanized Iron	Galv. I	Stationary	Stat.
Glass - Cathedral	Cath. Gl.	Steel	St.
Clear	Cl. Gl.	Studs	Stds.
Leaded	Ld. Gl.	Telephone	Phone
Obscure	Ob. Gl.	Terra Cotta	T.C.
Plate	Pl. Gl.	Thimble	Th
Wire (Polished, Rough)	W. Gl. (Pol., Rough).	Threshold	Thr.
Hardwood Floor	Hwd. Fl.	Tongue and Groove	T&G
Ironing Board	I.B.	Transom	Trans.
Jamb	Jb.	Treads	Tr.
Keene Cement Wainscot	K. Cem. Wains.	Veneer	Ven.
Leader	Ldr.	Wainscot	Wains.
Linoleum	Lino.	Window	Wnd.
Magnesite	Mag.	Wood Base	Wd. B.
Medicine Cabinet	M.C.	Wood Stair	Wd. St.
Metal Covered	Met. Cov.	Wrought Iron	W.I.

SHEET A

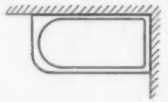
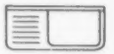
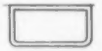
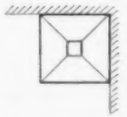
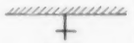
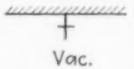
TENTATIVE STANDARD SYMBOLS FOR ARCHITECTURAL NOTATIONS, INCLUDING ABBREVIATIONS

Compiled by the Standardization Committee of the Northern California Chapter, A. I. A.

TENTATIVE STANDARD SYMBOLS FOR PLUMBING WORK

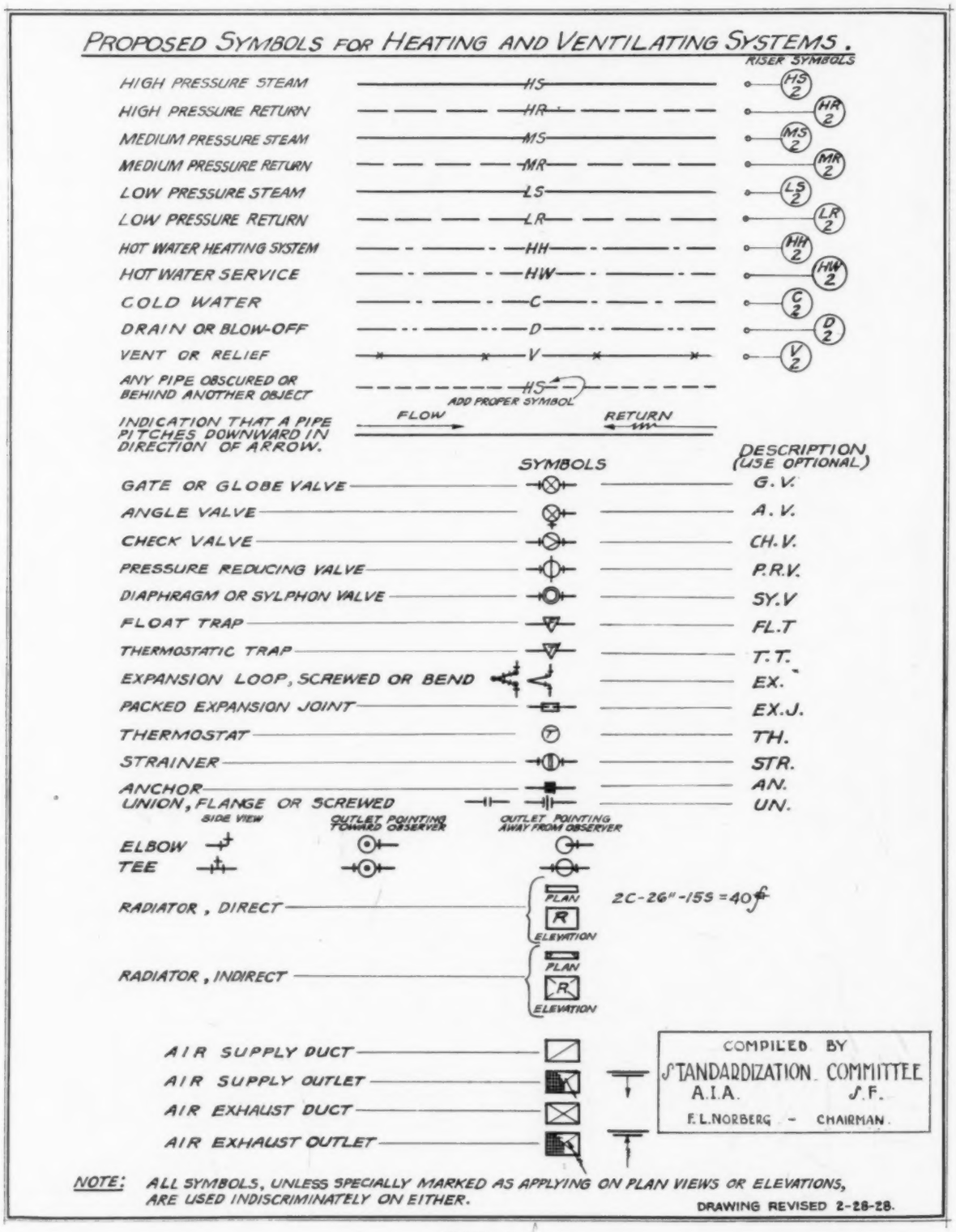
SHEET B

SYMBOLS FOR PLUMBING FIXTURES

CHARACTER	PLAN	CHARACTER	PLAN	CHARACTER	PLAN	CHARACTER	PLAN
Corner Tub		R. & L. Drain Board Kitchen Sink		Water Closet		Pedestal Lavatory	
Built in Tub		L. Hand Drain Board Kitchen Sink		Wall Urinal		Wall Lavatory	
Roll Rim Tub		Plain Kitchen Sink		Pedestal Urinal		Corner Lavatory	
Shower Stall		Wash Sink	W.S.	Stall Urinal		Manicure Lavatory	
Sitz Bath	S.B.	Slop Sink	S.S.	Trough Urinal		Dental Lavatory	 D. Lav.
Foot Bath	F.B.	Laundry Trays		Hose Rack	 H.R.	Pedestal Drinking Fountain	 Dr. F.
Bidet	 B	Combination Sink and Tray	S. T.	Hose Bib	 H.B	Wall Hung Drinking Fountain	 Dr. F.
Hot Water Tank	HW T	Combination Sink and Dish Washer		Gas Outlet	 G		
Water Heater	WH	Washing Machine	WM	Vacuum Outlet	 Vac.	Scale of Symbols $\frac{1}{4}'' = 1'-0''$	

DRAIN SYMBOLS

CHARACTER	PLAN
Floor Drain	Dr.
Shower Drain	Dr.
Garage Drain	Dr.
Floor Drain with Backwater Valve	Dr.
Refrigerator Drain	Dr.
Roof Sump	S.
Clean Out	C.O.
Grease Separator	G.S.
Oil Separator	O.S.



SHEET C

TENTATIVE STANDARD SYMBOLS FOR HEATING, VENTILATING AND MECHANICAL EQUIPMENT

Compiled by the Standardization Committee of the Northern California Chapter, A. I. A.

EFFICIENT PROCEDURE IN BUILDING

BY

MORTON C. TUTTLE

PRESIDENT, MORTON C. TUTTLE CO.

IN any field of enterprise, new methods and procedures are usually looked upon as visionary and impracticable, and in a field so fiercely competitive as that of the building industry, this would certainly seem to be the case. In the present paper I propose, it is true, to advocate new methods and procedures, but I submit them on the basis of practical experience of their effectiveness. The building industry has been and in fact still is conducted on the basis of competitive, lump-sum bidding. Yet one firm, which has refused to conform to this accepted method,—that is, to compete on a price basis for any contract,—has been satisfyingly successful in convincing discriminating clients that the methods herein discussed assure them genuine economy and satisfaction in their building and engineering operations. The firm departed from the established procedures of the trade because it believed that the theories upon which the building business has been conducted,—and more especially the procedure of competitive bidding,—have resulted in conditions and practices which are undesirable; and further, that they tend toward waste and extravagance, rather than toward economy and satisfaction. Let us, for a moment, consider certain facts regarding the building industry.

That building is hazardous business is a matter of common knowledge. No bank, for example, wishes to carry a large number of building trade accounts because of the notoriously bad credit risk. The Secretary of the Associated General Contractors of America says that failures among general contractors average 10 per cent a year; that is, in every period of five years one-half the companies engaged in general contracting fail. We need not here consider the economic evils inherent in such a state of affairs; we wish rather to consider the effect upon the contractors themselves,—those left in the field,—of a continuing economic slaughter of this kind.

Theoretically,—and practically,—a field of business in which one-half the competitors sink from sight every five years offers to the struggling survivors the constant threat of financial failure. In the competing and harassed building trade, the subject of price is emphasized from daylight to dark, year in and year out, and with the necessity for low cost constantly reiterated by architects and engineers,—and grimly illustrated by the failure of those who cannot pare costs to the quick,—it is small wonder that the building field is obsessed by the idea that only in the making of low costs,—at any cost,—lies success.

The building industry in general is conducted upon the theory that the architect or engineer shall design and specify in exact detail the building or engineering work which the owner has in mind. His plans and specifications are submitted to general contractors, who are prepared to bid,—lump sums,—for the complete contract. The contractor whose bid is accepted will then undertake to execute construction or engineering work of the exact sort which has been minutely described in the plans and specifications. It is assumed that the architect or engineer will then see to it that a building of exactly the quality and of exactly the kind specified shall be constructed. This necessity for safeguarding the owner's interests is based on the theory that a contractor who has been in snrewd competition on price for the contract may, —in case of adverse conditions,—be tempted to substitute less satisfactory material and workmanship than that which has been agreed upon. It is unnecessary to amplify the fact that any industry in which the chief emphasis is placed on price cannot offer great assurance for frankness of dealing.

The evils of this condition, furthermore, are becoming apparent to the contractors themselves. Many of the best men in the construction field now hesitate to accept the duties of superintending and managing work obtained on a fixed-price basis. They declare openly that in order to make a fair profit on work obtained in price competition they are forced to sharp practices. They realize, furthermore, that their abilities are confined to low-cost building, rather than to building in which they can take legitimate pride. They even admit that, carried to its extreme the competitive building business requires them to dissemble, to evade, to answer with partial truths, and to deal with their subcontractors on the basis of *caveat emptor*, rather than on any basis of equitable coöperation.

This state of affairs is, in our opinion, due solely to the pressure resulting from competitive bidding. The evils inherent in the old system are, as I have said, beginning to be recognized. In the desire to get away from the hazards and evasions of lump-sum bidding, many firms are developing new methods of obtaining work. A common device is combining a building company and an engineering department with the management of public utilities. Under such an arrangement, the consolidated company can turn over to its building department a considerable volume of business on any form of agency contract it pleases. Another means of avoiding the rigors of lump-sum bidding is the combination of financing and building business. With direct ownership in the property, a builder

can secure work without lump-sum competition.

There are, of course, certain companies which prefer the old method of competitive bidding. Investigation generally proves, however, that these are companies which, through special personal or business affiliations, are not subjected to the full force of price competition, and which can therefore obtain contracts at a good margin of profit. The only genuine enthusiasm for the competitive bid comes from individuals who, by chance or through some special advantage, have obtained contracts at abnormally high prices. When a contract is awarded on a high bid, the contractor is naturally free from all responsibility as to its actually representing a fair price,—fair, that is, to the owner. The extra profit is all the contractor's, and by that much he is in luck. But to fulfill a contract on a fixed bid always involves the element of risk. A friend of ours, who for years was insistent that lump-sum bidding offered the only satisfactory method of conducting a business, was wiped out by unforseen conditions.

Our inquiry into the procedure of the competitive bid confirmed us in the belief that not only is lump-sum bidding to the disadvantage of the contractor, but that it is, furthermore, greatly to the disadvantage of the prospective owner. As a matter of fact, rarely are the actual desires and needs of the prospective owner in the proposed building fully ascertained. The average owner does not always desire or need the precise building described by a given set of plans and specifications. What he does desire is a building approximately like that specified and planned. He has explained what he thinks he wants,—as clearly as he is capable of doing,—to his architect or his engineer, and he accepts,—hopefully or not,—the plans or specifications presently submitted to him as the best compromise he can obtain. Yet any given set of plans rarely represents the crystallization of the prospective owner's needs and desires. On the contrary, they often represent the results of uncertain thinking, faultily explained to the technician, who in turn translates those somewhat hazy ideas into the foreign language of blue prints and specification, and thus embodied submits them to the bidders, who do not dare to criticize the work of the designer, and whose business it is simply to name the prices,—the lowest prices,—at which they dare to attempt to fulfill the contract.

In the satisfaction of his every-day needs and desires, the prospective owner is accustomed to determine his selection on the basis of value and quality, and in most matters he has some experience or some means of comparison. In building he has perhaps little experience and small means of comparison. He ardently wishes he knew enough about engineering or architecture to judge how much included in the plans is necessary or unnecessary for his purpose. He wishes he knew the precise cost of this or that detail, and what the result of a change or omission would be. He wishes he knew, in terms of cost, what other details besides those shown on the plans are available, for he must consider not only the immediate cost of construction, but the cost of upkeep and necessary alterations: He would like to know if simpler and less expensive methods might not be equally satisfactory. He would like to be able to determine whether the architect and the engineer have added certain details from pure pride of craftsmanship, for, although he may believe his architect or engineer to be an ingenious technician, he is not quite sure that any technician thinks in terms of cost; and he is acutely aware that it is he himself who must produce the money, and later on pay for the upkeep of the building.

Upon such matters the owner can, of course, consult the architect or engineer, but these agents rarely possess a thorough knowledge of current costs, nor do they always base their judgments upon considerations of cost and utility.

Cost knowledge, however, is the stock in trade of the general contractor; an accurate and complete knowledge of costs is the basis of his reckoning. He must know the cost of details, he must know which method is the most economical, and he has shrewd ideas as to the earning value of this, that, or the other equipment. The best of the general contractors also maintain competent engineering departments. These departments are composed of men thoroughly expert in their lines of work, who of necessity have the idea of economy constantly in mind. If they cannot produce economical work, they have no value to the general contractor. But the general contractor, with his sound knowledge of cost and value, cannot go to the owner with suggestions as to changes in plan, even though those changes might save the owner a substantial sum. The contractor is frankly afraid that he may make enemies of the architect and the engineer,—and they are the sources of his business. An owner is infrequently in the building market; the architect and the engineer are continuously in it, and they are the last individuals the contractor wishes to antagonize.

This situation raises a barrier between the owner and the contractor,—the individual who is perhaps best equipped to give the owner the detailed information he desires as to cost and value. As a result of this state of affairs, the buying in the building trade is done almost wholly by the architect and the engineer, as agents for the owner, and like any agents they are likely to safeguard their stewardship by buying as cheaply as they dare and awarding their contracts at as low a price as they can.

One contracting firm instituted its business in the belief that if it were unhandicapped by the

rigidity of the competitive bid, its experts could study the owner's requirements and coöperate with him, and his architect or engineer, in the selection of the most suitable solution, by showing him the detailed cost of various methods of fulfilling those requirements. It believed that the translation of the details of the problem into terms of dollars and cents would result in producing more economical designs,—a premise which, again and again, has proved to be correct.

Present-day specialization in the many processes of building confirmed the belief that some form of coöperation is essential. It was observed, for example, that the general contractor is himself a buyer for a large part of his operation. In the old days he used to be a mechanic,—usually a carpenter or a bricklayer,—who with his own workers constructed the entire building. As building grew more complicated, subcontractors came into the field, until today there are some 30 subcontractors engaged in the construction of a modern office building. It was found that the general contractor sub-lets some 70 per cent of his work, and that half the remaining 30 per cent is accounted for by the cost of materials which the general contractor uses for his own operations. This means that the general contractor's payrolls on an ordinary office building amount to about 15 per cent of the cost;—that is, for 85 per cent he is buyer of materials and subcontracts.

The contractor can obviously only estimate on all these subcontracts in the total bid which he submits to the prospective owner or the architect. If he has over-estimated and still is awarded the contract, he gains and the owner loses. If he under-estimates, he will certainly be tempted to try to make up his loss by skimping somewhere. It seemed that some method could be devised whereby value rather than merely cost should be the basis of selection,—not only in the individual subcontract but in all purchase of material. It was felt that as the general contractor is the expert,—and probably the only expert,—on cost and values, rather than submitting to the owner and architect a hit-or-miss lump-sum bid, he could be of greater service as their agent and adviser in estimating the relative values of methods and materials. It is clear that if the maximum value in all materials and subcontracts is obtained, the owner will receive maximum value in a building completed without unnecessary delay. This has been proved in practice.

There is another factor of very great importance to the owner, which can be gained only through coöperation with the general contractor. As any large piece of construction progresses, improvements on the original plan may suggest themselves, and opportunities for economy arise. Seldom can an engineer or architect visualize a problem in its entirety months before the details of the operation are actually under way. In constantly studying his problem, in obtaining the ideas of the person engaged upon it, and in the acquired experience of the owner, there arise opportunities for improvement and for economies over the plan which was originally considered.

In dealing with a lump-sum bidder, the architect or the engineer properly hesitates to make a change in his plans and specifications, even though such a change be an obvious improvement and economy. He dreads any change in the original plans because of the difficulty of securing a fair adjustment of cost. On an omission the general contractor allows as little as possible; on an addition he charges as much as he can, and there is seldom a possibility of assuring the owner that the adjustment is fair. The total cost of even a few minor changes usually rises to an amazing total. The architect, accordingly, prefers to allow even a crudity embodied in the plans to remain uncorrected rather than face the perils of adjusting its cost with the lump-sum contractor.

Such desirable changes, however, are easily adjusted by the general contractor who is acting in coöperation with the owner. It should be noted that opportunities for desirable alterations usually occur not in the work handled directly by the general contractor, but in that of the subcontractors. Now the subcontractor looks to the general contractor for his business, precisely as the general contractor looks to the architect or engineer. The subcontractor is, therefore, very ready to coöperate with the general contractor. As the general contractor is responsible to the owner for the final cost, he will see to it that only a fair charge is allowed for any changes. Under the system of competitive bidding, however, the general contractor is likely to be entirely complaisant if a hard driven subcontractor gets a chance to pick up more profit. He is quite likely to feel that the owner, through his architect, has driven a hard bargain with him, and that it is little concern of his to decrease the burden of the extras. Incidentally, the general contractor usually receives a percentage of extra costs. It is not a situation that inspires much hope of sympathetic handling. The owner has dealt through an architect dealing with a general contractor, who in turn is dealing with a subcontractor. So, the owner can pursue the sequence of events down to one certain answer,—which is, that he pays.

The firm therefore concluded that if, in addition to a reputation for frankness, honesty and ability as contractors, it could establish a reputation as buyers and managers, prospective owners would employ it because of that reputation, with the assurance that they would receive sound work at a fair price. Owners have been found very

sensible of these financial benefits, and, contrary to general belief, many architects and engineers not only do not resent this procedure, but eagerly welcome it and coöperate in it. This coöperation of prospective owner, designer, estimator and constructor obviously produces economy. In practice these economies are greater than would be at first imagined.

Once convinced that this procedure was logical and that the theory by test adapted itself to practice, the firm was faced with another consideration. It was evident that it would obtain a considerable volume of work on an agency basis. This would come from persons for whom it had previously handled contracts, and who had confidence in the firm. It would come also from other persons who were obliged to start work before their plans and specifications were completed. The question was whether the volume of work that could be obtained from these sources would be sufficient. It was known that under the usual method of competitive bid, the firm could secure a large volume of work by bidding low enough. It could even expect to secure some work at prices greater than those named by some of the bidders with whom it would compete. Experience has shown, however, that out of a large volume of work thus obtained, about one-third would prove unprofitable—that on a small amount the firm would break about even, and that on the remainder would be able to make enough to show some profit.

It was not desired however, to conduct the business,—or any part of it,—on the competitive bid basis. First, it would be difficult to train men who would be effective in handling agency contracts, where frankness and a sense of value would play the principal parts. In addition, a practical sales difficulty presented itself, namely that if part of the contracts were handled by the firm as agents for the owner and another part as lump-sum contractors, the question would promptly arise in the minds of the owners for whom the firm was acting as agents as to whether it were giving their operations the best men it possessed and attacking their problems with the utmost vigor. There would, at least, be a suspicion that the firm's best energies would be turned to the projects on which the firm's cash was at stake. Accordingly, it was determined to handle the business on but one basis,—that of agents for the owner,—in the belief that, if successful in showing a list of satisfied clients, the firm could reasonably hope to prove to others the soundness of the theories under which it was working. It seemed, that the evidence given by the man whose money had been spent would probably be more effective than any other testimony that could be brought to bear on the soundness of these principles.

The decision wholly to abandon the lump-sum bid and conduct the business on an agency basis necessitated certain minor adjustments. The fact that under the newer method it became easier to make changes in an agency contract necessitated the setting up of an accounting system which would make the firm responsible for the cost of the work carried out according to the original plan. Such a system was devised so that before making any changes, either additions or deductions, the owner is informed as to the probable saving or the probable extra cost of these changes, and so kept constantly informed of the total cost. This was done because many agency contracts proved expensive, not because they were badly handled, but because the owner himself authorized changes without realizing in how much expense he was involving himself.

One other thing, however, is essential to the success of such a business, namely that the firm have no financial interest in any material or any other subsidiary enterprise. This required that no member of the firm should hold a directorship in any liability insurance companies, nor should he involve himself in agencies for any building material. Further, it seemed doubly wise not to own any plant, for various reasons.

In recent years many equipment companies have been developed making a business of supplying contractor's plants. These equipment companies are scattered throughout the country. From them can be obtained a wide selection of good equipment, and, with their ability to furnish this equipment at reasonable rentals and with short freight hauls, it is far more economical for an owner to deal with them than it is to permit a general contractor to railroad his plant to far distant points. Accordingly, the firm determined not to become involved in the plant problem, and followed the theory of owning no plant.

The firm proceeded in its work upon the theory that by combining the knowledge of the estimator and the builder with that of the owner and the designer, greater economies can be effected and better value obtained than by neglecting such coöperation and relying for economy simply upon shrewd buying. The work has been based upon the attack of the preliminary problems involved in the making of the plans and specifications, then intelligently building that which has been determined upon as most effective. It is believed that there is at least 5 per cent to be saved on the cost of the average building by the intelligent carrying out of such a procedure. This statement is made deliberately, and with the knowledge that the operations in the American building trade run to three or more billions of dollars a year. This saving might pay for architects' services.